MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for August, 1897, is based on 2,864 reports from stations occupied by regular and voluntary observers, classified as follows: 144 from Weather Bureau stations; numerous special river stations; 33 from post surgeons, received through the Surgeon General, United States Army; 2,525 from voluntary observers; 96 received through the Southern Pacific Railway Company; 14 from Life-Saving stations, received through the Superintendent United States Life-Saving Service; 32 from Canadian stations; 20 from Mexican stations; 7 from Jamaica, W. I. International simultaneous observations are received from a few stations and used together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Government Survey, Honolulu; Dr. Mariano Bárcena, Director of the Central Meteorological Observatory of Mexico; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; and Commander J. E. Craig, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe. Unless otherwise specifically noted, the text is written by the Editor, but the meteorological tables contained in the last section are furnished by Mr. A. J. Henry, Chief of the Division of Records and Meteorological Data.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time, and, as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to generally conform to the modern international system of standard meridians, one hour apart, beginning with Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are generally corrected to agree with the eastern standard; otherwise, the local meridian is mentioned.

CLIMATOLOGY OF THE MONTH.

GENERAL CHARACTERISTICS.

During August no hurricanes reached the United States from the West Indies, but one is reported to have struck the coast of Mexico and Gulf of California on the 6th and 7th; very few severe local storms were reported. Rainfall was very generally deficient and the temperature in excess. Agricultural interests generally begin to feel the increasing dryness of the air and the failure of rainfall; these latter features have been characteristic of the southern Pacific Ocean, Australia, and India for some years past, and the same causes that have produced the great drought in that region have evidently affected North America to a less extent.

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers, not reduced to standard gravity, and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart IV. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border.

The *mean pressure* during the current month was lowest in Nevada and Arizona and low in Saskatchewan and the Gulf of St. Lawrence; it was highest from Bermuda to the south Atlantic and Gulf coasts and high off the coast of Washington.

The highest reduced pressures were: In the United States, Key West, Jupiter, Tampa, and Charleston, 30.07. In Canada, Bermuda, 30.16. The lowest were: In the United States, Yuma, 29.76; Tucson, 29.77. In Canada, Kamloops, 29.83; Prince Albert, 29.86; Father Point, 29.87.

As compared with the normal for August, the mean pressure was in excess from the Mississippi to the Rocky Mountain Plateau, but deficient over the lower Lakes and the Middle States.

The greatest excesses were: In the United States, Denver, 0.11; Helena, 0.08; Lander and Bismarck, 0.07. In Canada, Minnedosa, 0.07; Edmonton, 0.05. The largest deficits were: In the United States, Roseburg, 0.09; Portland, Oreg., 0.07; Oswego and Portland, Me., 0.05.

As compared with the preceding month of July, the pressures reduced to sea level show a fall over New England and the Maritime Provinces and throughout the Pacific Coast region, but a rise from the Gulf States northward to the northwest provinces of Churchill and Franklin.

The largest rises were: In the United States, Bismarck, 0.15; Moorhead, 0.14. In Canada, Battleford, Prince Albert, and Winnipeg, 0.14. The largest falls were: In the United States, Portland, Oreg., 0.13; Roseburg, 0.12; Fort Canby, 0.11; Tatoosh Island, 0.10. In Canada, Father Point, 0.10.

AREAS OF HIGH AND LOW PRESSURE.

By Prof. H. A. HAZEN.

During the month the positions of eight highs and nine

lows have been sufficiently defined to be charted on Maps I and II. Each line on these maps shows the apparent path of the high or low.

It is not intended to convey the idea that there has been any actual motion of air particles along these lines. It is probable that the action is more like that seen when a wave of the ocean approaches the coast. In this case it is known that, though there is an appearance of water sweeping on toward the land, there is in reality no forward motion of water, but at each moment there is a mass of water moving up and down in a nearly vertical direction. There may be a transferrence of the cause or force producing the high or low in the atmosphere and the effect upon the air be entirely secondary without any motion of air particles. At a height of about 6,000 feet there is nearly a constant motion of air currents from a westerly direction, or, at least, toward a direction not coinciding with the apparent path of the high or low, and it must be admitted that this motion of air currents is independent of that of the high or low.

It is extremely difficult to locate the place of origin of this force which produces our highs and lows, but it must be above our highest mountains, for the changes in pressure on the apparent approach of a high or low toward a mountain are the same as those at the base of the mountain when we allow for the less density of the air at the mountain summit. It has also been shown that the change in temperature at the summit of Mount Washington occurs about eleven hours earlier than at the base as a high or low approaches it. This is an extremely significant fact and seems to show that the source of this heat, in part at least, is above the summits of our mountains.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	1, a. m.	52	116	8, p. m.	36	77	3,836	7.5	510	21.3
II	8, a. m.	53	111	14, a. m.	32	78	2,490	6.0	415	17.3
III	11, a. m.	42	126	18, a. m.	39	81	3,234	7.0	462	19.2
IV	17, a. m.	52	106	20, p. m.	42	85	1,950	3.5	557	23.2
V	21, p. m.	51	87	24, p. m.	44	59	1.632	3.0	544	22.7
VI	21, p. m.	47	127	24, a. m.	34	101	2,034	2.5	814	33.9
VII	25, a. m.	46	127	27, a. m.	39	93	1,818	2.0	909	37.9
VIII	28, a. m.	52	116	31, p. m.	38	76	2,160	3.5	617	25.7
Total	......	......	......	......	......	......	19,144	35.0	4,828	......
Mean of 8 tracks	......	......	......	......	......	......	2,393	......	604	25.2
Mean of 35 days	......	......	......	......	......	......	......	......	547	22.8
Low areas.										
I	[1]	51	122	5, a. m.	41	71	3,252	6.0	542	22.6
II	[2]	53	118	13, a. m.	47	63	3,383	8.5	398	16.6
III	8, a. m.	46	117	17, p. m.	51	66	3,562	9.5	575	15.6
IV	18, p. m.	48	81	20, p. m.	49	64	980	2.0	490	20.4
V	20, p. m.	41	99	24, a. m.	40	74	1,687	3.5	482	20.1
VI	21, a. m.	52	120	26, a. m.	49	65	3,040	5.0	608	25.3
VII	23, p. m.	53	115	28, a. m.	47	67	2,380	4.5	529	22.0
VIII	27, p. m.	47	105	30, p. m.	49	60	2,220	3.0	740	30.8
IX	29, p. m.	53	118	[3]	42	98	1,500	2.5	600	25.0
Total	......	......	......	......	......	......	22,004	44.5	4,764	......
Mean of 9 tracks	......	......	......	......	......	......	2,445	......	529	22.0
Mean of 44.5 days	......	......	......	......	......	......	......	......	492	20.5

In the column showing length of track the figures are only approximate and should be considered only to the nearest 10 miles.
[1] July 30, a. m.
[2] August 4, p. m.
[3] September, 1 a. m.

A study has been made of the place of first and last appearance, as well as of the length of their apparent paths and of their apparent velocity, and these studies are embodied in the accompanying table. The following remarks are added:

HIGHS.

The general tendency of the high areas of August has been along the parallel of about 40°, from the Rocky Mountains to the Atlantic. Their origin, however, may be traced in all but one case, which began over Lake Superior, either off the Pacific Coast or to the north of Montana. Five could be traced to the Atlantic Coast; one was last noted in Texas and two disappeared or mingled with a rather permanent high near the Middle Atlantic States.

LOWS.

The lows began, as just noted for the highs, in most cases to the north of Montana or near there. One was first noted in Nebraska and another in Ontario. The apparent motion of these lows was along the Great Lakes or along the parallels of 47° or 48°, or about 500 miles north of the general trajectory of the highs. Six of these lows were last noted in the Gulf of St. Lawrence, two off the middle Atlantic coast, and one in Iowa.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperatures and the departures from the normal, as determined from records of the maximum and minimum thermometers, are given in Table I for the regular stations of the Weather Bureau, which also gives the height of the thermometers above the ground at each station. The mean temperature is given for each station in Table II, for voluntary observers.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II. The mean temperatures given in Table III for Canadian stations are the simple means of 8 a. m. and 8 p. m. simultaneous observations.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean* temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* at regular stations were: In the United States, Yuma, 91.9; Phœnix, 89.2; Key West, 83.8; Galveston, 82.8. In Canada, Kamloops, 70.6; Medicine Hat, 67.2. The *lowest* were: In the United States, Point Reyes Light, 55.9; Eureka and Tatoosh Island, 56.5; San Francisco, 57.6. In Canada, Banff, 53.8; Father Point, 54.4; White River, 55.1.

As compared with the normal for August, the mean temperature for the current month was deficient in most of New England and the Lake Region, but in excess in the Rocky Mountain and Pacific Coast regions.

The greatest excesses were: In the United States, Portland, Oreg., 5.1; Winnemucca, 4.1; Spokane, 3.9; Baker City, 3.7; Roseburg, 3.6. In Canada, Medicine Hat, 1.5; Edmonton, 1.4. The greatest deficits were: In the United States, Yankton and Sioux City, 3.4; Huron, 3.2; El Paso, 2.7. In Canada, Rockliffe, 3.4; Montreal, 3.0.

Considered by districts the mean temperatures of the current month show departures from the normal as given in Table I. The greatest positive departures were: West Gulf, 0.7; Middle Plateau, 2.2; Northern Plateau, 2.8; North Pacific, 2.4, The greatest negative departures were: Lower Lake, 1.1; North Dakota, 0.8; upper Mississippi, 0.9; Missouri Valley, 1.3.

In Canada, Prof. R. F. Stupart says:

The temperature has been above the average by about 2° and 4° over the greater part of British Columbia and the Northwest Territories, and just above average in Manitoba, and thence eastward to Algoma and Nipissing; over the Peninsula of Ontario it has been below by between 2° and 4°, and in the Province of Quebec by from 0° to 2°.

The *years of highest and lowest mean temperatures* for August are shown in Table I of the Review for August, 1894. The mean temperature for the current month was the highest on record at: Port Angeles, 60.1; Carson City, 69.7; Baker City, 70.0; Roseburg, 70.4; Portland, Oreg., 71.1; Spokane, 72.2; Walla Walla, 76.8. It was the lowest on record at: Sioux City, 68.2.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: Yuma, 112; Phœnix, 110; Red Bluff, 109; Fresno, 108; Topeka and Shreveport, 105; Walla Walla and Palestine, 104; Sacramento and Fort Smith, 103. The lowest maxima were: Block Island and Nantucket, 77; Point Reyes Light, 71; San Francisco and Eureka, 70; Tatoosh Island, 68. The highest minima were: Phœnix and Corpus Christi, 73; Galveston, New Orleans, Key West, Jupiter, and Charleston, 71; Pensacola and Tampa, 70; Yuma and Mobile, 69. The lowest minima were: Winnemucca, 36; Carson City, 37; Havre, 38; Moorhead, 39; Williston, Huron, Marquette, and Northfield, 30.

The *years of highest maximum and lowest minimum temperatures* for August are given in the last four columns of Table I of the Review for August, 1896. During the current month the maxima temperatures were equal to or above the highest on record at: Carson City, 95; Atlanta, 96; Pensacola, 97; New Orleans, 99; Mobile, 101; Palestine, 104. The minimum temperatures were not below previous records at any Weather Bureau station.

The *greatest daily range of temperature and the data for computing the extreme and mean monthly ranges* are given for each of the regular Weather Bureau stations in Table I. The largest values of the greatest daily ranges were: Winnemucca and Idaho Falls, 47; Sacramento, Carson City, and Pierre, 44. The smallest values were: Hatteras, 11; Corpus Christi, 14; Block Island, 15; Galveston, Jupiter, and Nantucket, 17.

Among the *extreme monthly ranges* the largest were: Winnemucca, 62; Havre, 59; Carson City, 58; Williston, 57. The smallest were: Corpus Christi, Hatteras, and Nantucket, 18; Key West and Block Island, 20; San Francisco, 21; Tatoosh Island, 22.

Accumulated monthly departures from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal condition.

Districts.	Accumulated departures. Total.	Accumulated departures. Average.	Districts.	Accumulated departures. Total.	Accumulated departures. Average.
	°	°		°	°
New England	+ 3.8	+ 0.5	Florida Peninsula	0.0	0.0
Middle Atlantic	+ 0.9	+ 0.1	Southern Slope	0.0	0.0
South Atlantic	+ 1.3	+ 0.2			
East Gulf	+ 1.8	+ 0.2			
West Gulf	+ 6.9	+ 0.9	Ohio Valley and Tenn	− 0.9	− 0.1
Lower Lake	+ 2.5	+ 0.3	North Dakota	− 5.8	− 0.7
Upper Lake	+ 8.9	+ 1.1	Northern Slope	− 2.1	− 0.3
Upper Mississippi Valley	+ 1.7	+ 0.2	Southern Plateau	− 6.4	− 0.8
Missouri Valley	+ 0.8	+ 0.1	Middle Plateau	− 5.8	− 0.7
Middle Slope	+ 3.0	+ 0.4	Middle Pacific	− 2.0	− 0.2
Northern Plateau	+ 8.2	+ 1.0	South Pacific	− 4.3	− 0.5
North Pacific	+ 1.2	+ 0.2			

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-point for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, is given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer. The mean wet-bulb temperature is now published in Table I; it is always intermediate, and generally about half way between the temperature of the air and of the dew-point. The quantity of water evaporated in a unit of time from the muslin surface may be considered as depending essentially upon the wet-bulb temperature, the dew-point, and the wind.

The *relative humidity*, or the ratio between the moisture that is present in the air and the moisture that it would contain if saturated at its observed temperature is given in Table I as deduced from the 8 a. m. and 8 p. m. observations. The general average for a whole day, or any other interval, would properly be obtained from the data given by an evaporometer, but may also be obtained, approximately, from frequent observations of the relative humidity.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was largest, exceeding 10 inches, in southern Mississippi, Alabama, and northwestern Florida. In general it was less than 4 inches; little or none fell at Rocky Mountain, Oregon, and California stations; regions of from 3 to 5 inches occurred in eastern Arizona and western Texas. The larger values for regular stations were: Mobile, 11.56; Tampa, 7.84; Charleston, 7.34; Narragansett Pier, 6.05; Jupiter, 6.85. In Canada, Bermuda, 7.40.

Details as to *excessive precipitation* are given in Tables XI and XII.

The *diurnal variation*, as shown by tables of hourly means of the total precipitation, deduced from the self-registering gauges kept at the regular stations of the Weather Bureau, is not now tabulated.

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was in excess in portions of Alabama, Georgia, South Carolina, eastern Tennessee, and southern Florida, but elsewhere generally deficient. The large excesses were: August, 5.2; Mobile, 4.7; Montgomery, 2.4; Fort Smith, 2.2. The large deficits were: Raleigh, 6.0; Kittyhawk, 5.5; Cape Henry and Wilmington, 4.0.

The *average departure* for each district is given in Table I. By dividing each current precipitation by its respective normal the following corresponding percentages are obtained (precipitation is in excess when the percentage of the normal exceeds 100):

Above the normal: Florida Peninsula, 111; East Gulf, 10[illegible]; southern Plateau, 107; Northern Plateau, 131.

Normal: northern Slope, middle Pacific, and southern Pacific.

Below the normal: New England, 98; middle Atlantic, 63; south Atlantic, 77; west Gulf, 83; Ohio Valley and Tennessee, 64; lower Lake, 86; upper Lake, 83; North Dakota, 66; upper Mississippi, 57; Missouri Valley, 70; middle Slope, 92; southern Slope, 79; middle Plateau, 71; north Pacific, 90.

In Canada, Prof. R. F. Stupart says:

The rainfall was nearly average over the greater portion of the Dominion. The only districts in which there was any marked departure above were those lying north and west of Lake Superior and near the Georgian Bay, and the only marked deficiency occurred in the upper St. Lawrence Valley, where the amount was just about half the average.

The *years of greatest and least precipitation* for August are

given in the REVIEW for August, 1890. The precipitation for the current month was the greatest on record at: Augusta, 10.39; Narragansett Pier, 6.95. It was the least on record at: San Antonio, 0.40; Moorhead, 0.88; Indianapolis, 0.42; Kittyhawk, 1.33; Cape Henry, 1.53.

The *total accumulated monthly departures* from January 1 to the end of the current month are given in the second column of the following table; the third column gives the current accumulated precipitation expressed as a percentage of its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
New England	+ 1.70	106	Middle Atlantic	− 2.10	93
Florida Peninsula	+ 4.50	114	South Atlantic	− 3.30	91
Ohio Valley and Tenn	+ 1.20	104	East Gulf	− 1.80	95
North Dakota	+ 0.10	101	West Gulf	− 6.40	78
Upper Mississippi Valley	+ 1.70	107	Lower Lake	− 1.10	95
Middle Slope	+ 0.70	104	Upper Lake	− 0.30	99
Southern Slope	+ 1.70	111	Missouri Valley	− 1.30	94
Southern Plateau	+ 2.80	149	Northern Slope	− 1.00	91
Middle Plateau	+ 0.10	101	North Pacific	− 1.60	95
Northern Plateau	+ 0.40	104	Middle Pacific	− 2.30	88
South Pacific	+ 0.80	110			

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 30, 31. Arizona, 2, 6, 18, 19. Arkansas, 30. California, 20. Colorado, 1, 2, 3, 6, 14 to 17, 30. Connecticut, 15. Florida, 13. Georgia, 30. Idaho, 4. Illinois, 9. Indiana, 1, 14, 15, 19, 24. Iowa, 2, 3, 7, 20, 23, 25. Kentucky, 1, 2, 4, 6, 10, 15, 22, 23. Louisiana, 30. Maryland, 11, 14, 15, 16, 23, 24, 25. Massachusetts, 22. Michigan, 9, 10, 14, 15, 24, 28, 29. Minnesota, 2, 28, 31. Missouri, 3, 4, 19, 21, 25. Montana, 1, 5, 13, 31. Nebraska, 7, 13, 16, 17, 20. Nevada, 17, 26. New Jersey, 4, 16, 22, 23. New Mexico, 4, 6, 9, 10, 11, 16, 18, 19, 21. New York, 10, 12, 15, 17, 19. North Carolina, 5, 16, 20, 25, 31. North Dakota, 3, 18, 27, 28. Ohio, 4, 10, 15, 16, 29. Pennsylvania, 4, 10, 15, 18. South Carolina, 1, 6, 14, 29, 30, 31. South Dakota, 1, 31. Tennessee, 3, 22, 25, 30. Vermont, 9, 15, 16, 19. Virginia, 5, 10, 16, 23, 30. Washington, 4. West Virginia, 23. Wisconsin, 9. Wyoming, 2, 14, 17, 19, 30.

WIND.

The *prevailing winds* for August, 1897, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

Maximum wind velocities are given in Table I, which also gives the altitudes of the Weather Bureau anemometers above the ground. Maxima of 50 miles or more per hour were reported during this month at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Chicago, Ill	1	56	ne.	Knoxville, Tenn	30	50	sw.
Duluth, Minn	8	50	nw.	Sault Ste. Marie, Mich.	29	50	nw.
Fort Canby, Wash	31	52	s.	Tatoosh, Wash	3	50	e.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table VIII. These latter resultants are also shown graphically on Chart IV, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IX, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 10th, 227, and 15th, 277.

Reports were most numerous from Colorado, 236; Florida, 238; Ohio, 274.

Thunderstorm days were most numerous in: Florida, 31; New Mexico, 29; Mississippi, 28; Colorado and Louisiana, 27.

In Canada.—Thunderstorms were reported as follows: St. Johns, 5, 6, 8, 9, 10, 14; Halifax, 6, 15, 25; Grand Manan, 16; Yarmouth, 11, 16; Charlottetown, 6, 9, 16; Chatham, 16, 20; Father Point, 15, 16; Quebec, 8, 10, 15, 16, 20, 27; Montreal, 3, 10, 16, 25; Rockliffe, 9; Toronto, 10, 15, 18, 24, 30; White River, 15, 29; Port Stanley, 4, 10, 25, 29, 30; Saugeen, 10; Parry Sound, 10, 14, 18, 24; Port Arthur, 9, 13, 28; Winnipeg, 8, 12; Minnedosa, 12; Qu'Appelle, 3, 11, 21, 25; Medicine Hat, 7; Swift Current, 1, 5; Calgary, 9, 12; Banff, 7, 10, 11, 16, 21, 25; Prince Albert, 7, 12, 13, 15, 21; Edmonton, 5, 11, 12, 24; Battleford, 7, 10, 11, 12.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 8th to the 16th, inclusive. On the remaining twenty-two days of this month 74 reports were received, or an average of about 3 per day. The dates on which the number of reports of auroras for the whole country especially exceeded this average were: 19th, 13; 20th, 7; 29th, 7.

Reports were most numerous from Minnesota, 9; North Dakota, 19; Ohio, 10; Wisconsin, 8.

The number of reports was a large percentage of the number of observers in: North Dakota, 40.

In Canada.—Auroras were reported as follows: Grand Manan, 20; Yarmouth, 31; Quebec, 20, 22, 28, 30; Montreal, 20, 23; White River, 29, 30; Winnipeg, 2, 15, 23, 26, 29, 30; Minnedosa, 1, 3, 26, 29, 30.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 22 regular stations of the Weather Bureau by its photographic, and at 40 by its thermal effects; at one of these stations records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric records show seventy-fifth meridian time; for convenience the results are all given in Table X for each hour of local mean time. In order to complete the record of the duration of cloudiness these registers are supplemented by special personal observations of the state of the sky near the sun in the hours after sunrise and before sunset, and the cloudiness for these hours has been added as a correction to the instrumental records, whence there results a complete record of the duration of sunshine from sunrise to sunset.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table X for the 61 stations at which instrumental self-registers are maintained.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *durations* of effective sunshine whence the durations relative to possible sunshine are derived; the observers' personal estimates give the percentage of *area* of clear sky. These numbers have no necessary relation to each other, since stationary banks of clouds may obscure the sun without covering the sky, but when all clouds have a steady motion past the sun and are uniformly scattered over the sky, the percentages of duration and of area agree closely. For the sake of comparison, these percentages have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental records of percentages of durations of sunshine are almost always larger than the observers' personal estimates of percentages of area of clear sky; the average excess for August, 1897, is 10 per cent for photographic and 10 per cent for thermometric records.

The details are shown in the accompanying table, in which the stations are arranged according to the *total possible* duration of sunshine, and not according to the *observed* duration.

Difference between instrumental and personal observations of sunshine.

Stations.	Latitude.		Apparatus.	For whole month.		Instrumental record of sunshine.			
				Total possible.	Personal.	Photographic.	Difference.	Thermometric.	Difference.
	°	'		*H'rs.*	%	%	%	%	%
Key West, Fla	24	34	T.	403.3	47	.....	.....	77	+30
Tampa, Fla	27	57	T.	406.9	58	.....	.....	63	+ 5
Galveston, Tex	29	18	P.	408.0	50	58	+ 8	.....	.....
New Orleans, La	29	58	T.	409.7	43	.....	.....	42	− 1
Savannah, Ga	32	05	P.	412.6	44	54	+10	.....	.....
Vicksburg, Miss	32	22	T.	412.6	54	.....	.....	63	+ 9
San Diego, Cal	32	43	P.	414.0	82	74	− 8	.....	.....
Charleston, S. C.	32	47	T.	414.0	44	.....	.....	50	+ 6
Phœnix, Ariz	33	28	P.	414.0	71	78	+ 7	.....	.....

Difference between instrumental and personal observations.—Cont'd.

Stations.	Latitude.		Apparatus.	Total possible duration for the whole month.	Personal estimated area of clear sky.	Instrumental record of sunshine.			
						Photographic.	Difference.	Thermometric.	Difference.
	°	'		*H'rs.*	%	%	%	%	%
Atlanta, Ga	33	45	T.	415.8	47	.....	.....	51	+ 4
Los Angeles, Cal	34	03	P.	415.8	72	83	+11	.....	.....
Wilmington, N. C.	34	14	T.	415.8	62	.....	.....	66	+ 4
Little Rock, Ark	34	45	T.	417.1	65	.....	.....	85	+20
Chattanooga, Tenn	35	04	T.	417.1	50	.....	.....	55	+ 5
Santa Fe, N. Mex	35	41	P.	418.7	56	70	+14	.....	.....
Raleigh, N. C.	35	45	T.	418.7	48	.....	.....	72	+24
Nashville, Tenn	36	10	T.	418.7	66	.....	.....	79	+13
Fresno, Cal	36	43	T.	420.1	88	.....	.....	94	+ 6
Dodge City, Kans	37	45	P.	422.1	69	79	+10	.....	.....
San Francisco, Cal	37	48	T.	422.1	54	.....	.....	60	+ 6
Louisville, Ky	38	15	T.	422.1	55	.....	.....	73	+18
St. Louis, Mo	38	38	T.	423.2	64	.....	.....	81	+17
Washington, D. C	38	54	P.	423.2	61	78	+17	.....	.....
Kansas City, Mo	39	05	P.	423.2	68	72	+ 4	.....	.....
Cincinnati, Ohio	39	06	T.	423.2	67	.....	.....	72	+ 5
Parkersburg, W. Va	39	16	T.	423.2	45	.....	.....	60	+15
Baltimore, Md	39	18	T.	423.2	54	.....	.....	49	− 5
Atlantic City, N. J	39	22	P.	423.2	63	75	+12	.....	.....
Denver, Colo	39	45	P.	425.2	55	74	+19	.....	.....
Indianapolis, Ind	39	46	T.	425.2	52	.....	.....	68	+16
Philadelphia, Pa	39	57	T.	425.2	50	.....	.....	66	+16
Columbus, Ohio	39	58	T.	425.2	53	.....	.....	74	+19
Harrisburg, Pa	40	16	T.	425.2	55	.....	.....	77	+22
Pittsburg, Pa	40	32	T.	427.4	49	.....	.....	44	− 5
New York, N. Y	40	43	T.	427.4	53	.....	.....	69	+16
Salt Lake City, Utah	40	46	P.	427.4	48	77	+29	.....	.....
Eureka, Cal	40	48	P.	427.4	40	28	−12	.....	.....
Cheyenne, Wyo	41	08	P.	427.4	55	.....	.....	.....	.....
Omaha, Nebr	41	16	P.	427.4	57	72	+15	.....	.....
Cleveland, Ohio	41	30	T.	429.4	53	.....	.....	60	+ 7
Des Moines, Iowa	41	35	T.	429.4	72	.....	.....	74	+ 2
Chicago, Ill	41	53	T.	429.4	55	.....	.....	54	− 1
Erie, Pa	42	07	T.	429.4	52	.....	.....	73	+21
Binghamton, N. Y	42	08	T.	429.4	50	.....	.....	65	+15
Detroit, Mich	42	20	T.	429.4	56	.....	.....	69	+13
Boston, Mass	42	21	T.	429.4	52	.....	.....	63	+11
Dubuque, Iowa	42	30	T.	429.4	62	.....	.....	64	+ 2
Albany, N. Y	42	39	T.	431.3	55	.....	.....	78	+23
Buffalo, N. Y	42	53	T.	431.3	49	.....	.....	77	+18
Rochester, N. Y	43	08	T.	431.3	56	.....	.....	59	+ 3
Idaho Falls, Idaho	43	29	T.	431.3	65	.....	.....	67	+ 2
Portland, Me	43	39	T.	433.6	52	.....	.....	63	+11
Northfield, Vt	44	10	P.	433.6	45	57	+12	.....	.....
Eastport, Me	44	54	P.	435.6	38	51	+13	.....	.....
St. Paul, Minn	44	58	P.	435.6	45	59	+14	.....	.....
Minneapolis, Minn	44	59	T.	435.6	.....	.....	.....	66	.....
Portland, Oreg	45	32	T.	437.6	71	.....	.....	82	+11
	45	32	P.	437.6	71	80	+ 9	.....	.....
Helena, Mont	46	34	P.	440.0	78	85	+ 7	.....	.....
Bismarck, N. Dak	46	47	P.	440.0	68	70	+ 2	.....	.....
Seattle, Wash	47	38	T.	442.5	72	.....	.....	80	+ 8
Spokane, Wash	47	40	P.	442.5	65	89	+24	.....	.....

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Snowfall and rainfall are expressed in inches.

Alabama.—The mean temperature was 78.8°, or 0.1° below normal; the highest was 106°, at Gadsden on the 3d, and the lowest, 53°, at Maplegrove on the 13th, and at Scottsboro on the 25th. The average precipitation was 5.58, or 1.57 above normal; the greatest monthly amount, 13.83, occurred at Citronelle, and the least, 1.05, at Clanton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 79.9°, or 0.9° above normal; the highest was 112°, at Signal on the 18th, and at Yuma on the 17th, and the lowest, 43°, at Whipple on the 20th. The average precipitation was 2.30, or 0.24 below normal; the greatest monthly amount, 5.37, occurred at Mount Huachuca, and the least, 0.17, at Flagstaff.—*W. T. Blythe.*

Arkansas.—The mean temperature was 79.7°, or 1.6° above normal; the highest was 111°, at Malvern on the 4th, and the lowest, 45°, at Jonesboro on the 17th. The average precipitation was 2.59, or 0.63 below normal; the greatest monthly amount, 5.97, occurred at Fort Smith, and the least, 0.25, at Camden.—*F. H. Clarke.*

California.—The mean temperature was 73.9°, or 0.2° above normal; the highest was 124°, at Salton on the 12th, and the lowest, 18°, at Sneddens Ranch on the 29th. The average precipitation was 0.03, or normal; the greatest monthly amount, 1.57, occurred at Little Rock Creek, while no rain fell at most places.—*W. H. Hammon.*

Colorado.—The mean temperature was 65.0°, or 1.0° below normal; the highest was 102°, at Lamar on the 1st, and the lowest, 21°, at Walden on the 15th. The average precipitation was 2.38, or 0.70 above normal; the greatest monthly amount, 8.10, occurred at Castlerock, and the least, 0.26, at Paonia.—*F. H. Brandenburg.*

Florida.—The mean temperature was 81.6°, or 0.2° above normal; the highest was 104°, at Macclenny on the 2d, and the lowest, 65°, at Manatee on the 7th, at Wausau on the 25th, and at New Smyrna on the 27th. The average precipitation was 6.68, or 0.20 above normal; the greatest monthly amount, 12.41, occurred at De Funiak Springs, and the least, 19.1, at Merritts Island.—*A. J. Mitchell.*

Georgia.—The mean temperature was 78.3°, or 0.7° below normal; the highest was 105°, at Poulen on the 2d, and the lowest, 50°, at Cedartown on the 14th, and at Diamond on the 30th. The average precipitation was 5.07, or 0.32 above normal; the greatest monthly amount, 10.39, occurred at Augusta, and the least, 1.63, at Clayton.—*J. B. Marbury.*

Idaho.—The mean temperature was 69.0°; the highest was 111°, at Lewiston on the 20th, and the lowest, 29°, at Minidoka on the 9th. The average precipitation was 0.32; the greatest monthly amount, 1.00, occurred at Martin, while none fell at several stations.—*D. P. McCallum.*

Illinois.—The mean temperature was 71.7°, or 1.5° below normal; the highest was 108°, at Mount Vernon on the 4th, and the lowest, 36°, at Lanark on the 20th. The average precipitation was 1.12, or 1.89 below normal; the greatest monthly amount, 2.79, occurred at Aurora, and the least, 0.01, at Carrollton and Palestine.—*C. E. Linney.*

Indiana.—The mean temperature was 71.4°, or 0.7° below normal; the highest was 102°, at Salem on the 3d, and at Vincennes on the 4th, and the lowest, 40°, at Laporte on the 20th, and at Warsaw on the 22d. The average precipitation was 1.59, or 1.39 below normal; the greatest monthly amount, 4.77, occurred at Huntington, and the least, 0.29, at Hammond.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 68.9°, or 2.4° below normal; the highest was 104°, at College Springs on the 2d, and the lowest, 35°, at Mason City on the 29th. The average precipitation was 1.86, or 1.39 below normal; the greatest monthly amount, 4.98, occurred at Logan, and the least, 0.47, near Ames.—*G. M. Chappel.*

Kansas.—The mean temperature was 76.0°, or 0.1° below normal; the highest was 109°, at Abilene, Cunningham, Medicine Lodge, Minneapolis, and Salina on the 1st; the lowest was 46°, at Seneca on the 20th, Norton on the 21st, and Phillipsburg on the 25th. The average precipitation was 3.06, or 0.09 below normal; the greatest monthly amount, 6.30, occurred at Lakin and Pratt, and the least, 0.56, at Beloit.—*T. B. Jennings.*

Kentucky.—The mean temperature was 75.2°, or 0.6° below normal; the highest was 104°, at Paducah on the 1st and at Greensburg on the 2d, and the lowest, 49°, at Eubank on the 26th. The average precipitation was 2.33, or 0.95 below normal; the greatest monthly amount, 5.45, occurred at Burnside, and the least, 0.40, at Earlington.—*Frank Burke.*

Louisiana.—The mean temperature was 81.2°, or 0.7° above normal; the highest was 109°, at Liberty Hill on the 4th, and the lowest, 58°, at Mansfield on the 24th. The average precipitation was 5.84, or 0.48 above normal; the greatest monthly amount, 13.46, occurred at Hammond, and the least, 0.63, at Mansfield.—*R. E. Kerkam.*

Maryland and Delaware.—The mean temperature was 71.8°, or 1.7° below normal; the highest was 95°, at Westernport on the 4th and at Pocomoke City on the 16th, and the lowest, 39°, at Deerpark on the 26th and at Sunnyside on the 27th. The average precipitation was 3.51, or 0.17 below normal; the greatest monthly amount, 5.62, occurred at Bachmans Valley, and the least, 1.48, at Port Deposit.—*F. J. Walz.*

Michigan.—The mean temperature was 64.7°, or 2.0° below normal; the highest was 97°, at Eloise on the 3d, and the lowest, 28°, at Humboldt on the 23d. The average precipitation was 2.04, or 0.39 below normal; the greatest monthly amount, 4.84, occurred at Hanover, and the least, 0.31, at Big Rapids.—*C. F. Schneider.*

Minnesota.—The mean temperature was 64.2°, or 2.7° below normal; the highest was 95°, at New London on the 28th, and the lowest, 26°, at Tower on the 25th. The average precipitation was 2.54, or 0.17 below normal; the greatest monthly amount, 5.55, occurred at Glenwood, and the least, 0.30, at Milan.—*T. S. Outram.*

Mississippi.—The mean temperature was 80.6°, or 0.6° above normal; the highest was 108°, at Windham on the 4th, and the lowest, 55°, at Batesville on the 24th. The average precipitation was 5.19, or 1.23 above normal; the greatest monthly amount, 15.60, occurred at Magnolia, and the least, 0.69, at Corinth.—*R. J. Hyatt.*

Missouri.—The mean temperature was 74.1°, or 0.7° below normal; the highest was 108°, at Emma on the 1st, and the lowest, 41°, at Potosi on the 17th and at Sublett on the 20th. The average precipitation was 2.29, or 0.86 below normal; the greatest monthly amount, 7.87, occurred at Houstonia, and the least, 0.56, at Oakfield.—*A. E. Hackett.*

Montana.—The mean temperature was 67.9°, or 0.4° below normal; the highest was 104°, at Chinook and Glasgow on the 11th, and the lowest, 31°, at Kipp on the 2d and at Manhattan on the 26th. The average precipitation was 0.31, or 0.43 below normal; the greatest monthly amount, 1.58, occurred at Maryville, while none fell at Fort Benton.—*J. Warren Smith.*

Nebraska.—The mean temperature was 70.8°, or 1.7° below normal; the highest was 107°, at Imperial on the 1st, and the lowest, 37°, at Nebraska City on the 20th. The average precipitation was 2.60, or 0.02 below normal; the greatest monthly amount, 7.75, occurred at Loup, and the least, trace, at Fort Robinson.—*G. A. Loveland.*

Nevada.—The mean temperature was 73.3°, or 0.9° above normal; the highest was 110°, at St. Thomas on the 4th, and the lowest, 31°, at Hamilton on the 31st. The average precipitation was 0.31, or 0.02 above normal; the greatest monthly amount, 1.75, occurred at Fenelon, while none fell at several stations.—*R. F. Young.*

New England.—The mean temperature was 66.1°, or 0.5° below normal; the highest was 91°, at Stratford, N. H., on the 8th, and the lowest, 33°, at Fort Fairfield, Me., on the 23d. The average precipitation was 4.16, or 0.10 below normal; the greatest monthly amount, 8.67, occurred at Colchester, Conn., and the least, 1.41, at Portland, Me.—*J. W. Smith.*

New Jersey.—The mean temperature was 71.0°, or 1.3° below normal; the highest was 92°, at Lambertville on the 11th, and the lowest, 41°, at Charlotteburg on the 21st. The average precipitation was 4.39, or 0.55 above normal; the greatest monthly amount, 8.69, occurred at Newark, and the least, 2.07, at Atlantic City.—*E. W. McGann.*

New Mexico.—The mean temperature was below normal; the highest was 100°, at Eddy on the 9th, and the lowest, 26°, at Buckman's on the 23d. The average precipitation was slightly above normal; the greatest monthly amount, 5.31, occurred at Fort Bayard, and the least, trace, at Olio.—*H. B. Hersey.*

New York.—The mean temperature was 66.8°, or 1.3° below normal; the highest was 99°, at Mount Morris on the 3d, and the lowest, 34°, at South Canisteo on the 21st. The average precipitation was 3.20, or 0.35 below normal; the greatest monthly amount, 6.60, occurred at Cooperstown, and the least, 0.20, at Mount Morris.—*R. M. Hardinge.*

North Carolina.—The mean temperature was 75.1°, or 0.7° below normal; the highest was 100°, at Henderson on the 5th, and the lowest, 45°, at Linville on the 25th. The average precipitation was 3.41, or 2.26 below normal; the greatest monthly amount, 7.35, occurred at Selma, and the least, 1.16, at Morganton.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 64.1°, or 2.0° below normal; the highest was 106°, at New England City on the 25th, and the lowest, 29°, at Gallatin and McKinney on the 30th. The average precipitation was 1.18, or 0.40 below normal; the greatest monthly amount, 3.48, occurred at Hamilton, and the least, 0.16, at Towner.—*B. H. Bronson.*

Ohio.—The mean temperature was 69.4°, or 1.0° below normal; the highest was 101°, at Celina on the 3d, at Carrollton on the 4th, and at Cherryfork on the 3d and 4th; the lowest was 38°, at Millport on the 30th and at Greenhill on the 31st. The average precipitation was 2.72, or 0.34 below normal; the greatest monthly amount, 8.40, occurred at Colebrook, and the least, 1.14, at Norwalk.—*H. W. Richardson.*

Oklahoma.—The mean temperature was 79.4°; the highest was 108°, at Lehigh on the 4th, and the lowest, 51°, at Anadarko on the 19th. The average precipitation was 3.12; the greatest monthly amount, 5.48, occurred at Jefferson, and the least, 0.43, at Lehigh.—*J. I. Widmeyer.*

Oregon.—The mean temperature was 68.9°, or 2.7° above normal; the highest was 109°, at Pendleton on the 19th, and the lowest, 30°, at Government Camp on the 1st; the month was the warmest August on record. The average precipitation was 0.46, or 0.16 above normal; the greatest monthly amount, 2.10, occurred at Bay City, while none fell at Ashland and Newbridge.—*B. S. Pague.*

Pennsylvania.—The mean temperature was 67.9°, or 1.4° below normal; the highest was 97°, at Greensboro on the 4th, and the lowest, 34°, at Lockhaven on the 18th. The average precipitation was 3.17, or 0.78 below normal; the greatest monthly amount, 8.60, occurred at Swiftwater, and the least, 0.34, at Cannonsburg.—*T. F. Townsend.*

South Carolina.—The mean temperature was 78.0°, or 0.3° below normal; the highest was 102°, at Gillison on the 6th and 7th, and the lowest, 57°, at Walhalla on the 23d, 24th, and 25th. The average precipitation was 5.16, or 0.97 below normal; the greatest monthly amount, 9.93, occurred at Trenton, and the least, 1.27, at Winnsboro.—*J. W. Bauer.*

South Dakota.—The mean temperature was 66.9°, or 3.0° below normal; the highest was 109°, at Nowlin on the 25th, and the lowest, 35°. at Ashcroft. The average precipitation was 2.27, or 0.16 below normal; the greatest monthly amount, 4.96, occurred at Alexandria, and the least, 0.04, at Edgemont.—*S. W. Glenn.*

Tennessee.—The mean temperature was 76.0°, or about normal; the highest was 105°, at St. Joseph on the 3d, and the lowest, 43°, at Hohenwald on the 17th. The average precipitation was 2.88, or 0.75 below normal; the greatest monthly amount, 6.40, occurred at Rugby, and the least, 0.16, at Covington.—*H. C. Bate.*

Texas.—The mean temperature for the State was 0.3° above the normal. It was about normal over the panhandle and ranged from 0.5 to 3.4 above over north and central Texas, with the greatest excess in the vicinity of Corsicana, while over other portions of the State there was a general deficiency, ranging from 0.2 to 2.4 over east, southwest, and west Texas, and from 0.3 to 1.7 over the coast district except in the vicinity of Houston and Brownsville, where it was normal, and at Brazoria, where it was 3.3 above. The greatest deficiency for the month was in the vicinity of Palestine. The highest was 108°, at Camp Eagle Pass on the 5th, at Duval on the 5th, at Emory on the 4th, at Lufkin on the 5th and 6th, at Mann on the 9th, at Panter on the 7th and 10th, at Texarkana on the 4th, and at Waxahachie on the 4th; and the lowest, 50°, at Valentine on the 24th. The average precipitation for the State was 0.28 below the normal. There was a general deficiency throughout the State except over the central portion of north Texas, the eastern and southern portions of central Texas, and the southern portion of east Texas, west Texas, and in the vicinity of Fort McIntosh and Houston, where there was an excess ranging from 0.19 to 4.41, with the greatest in the vicinity of Fort McIntosh. The deficiency ranged from 0.14 to 3.28 over the panhandle, the eastern and western portions of north Texas, southwest Texas, the western portion of central Texas, and the northern portion of east Texas, and from 0.09 to 3.41 over the coast district, with the greatest deficit in the vicinity of Orange. The greatest monthly amount, 7.53, occurred at Houston, and the least, 0.18, at Waco.—*I. M. Cline.*

Utah.—The mean temperature was 69.4°, or about normal; the high-

est was 111°, at Mount Pleasant on the 10th, and the lowest, 35°, at Loa on the 20th. The average precipitation was 0.40, or 0.42 below normal; the greatest monthly amount, 1.56, occurred at Parowan, and the least, trace, at Corinne.—*J. H. Smith.*

Virginia.—The mean temperature was 73.7°, or 1.3° below normal; the highest was 100°, at Farmville on the 3d, and at Petersburg, Bonair, and Nottoway on the 30th, and the lowest, 47°, at Doswell on the 10th, and at Dale Enterprise on the 26th. The average precipitation was 2.42, or 1.17 below normal; the greatest monthly amount, 5.62, occurred at Warsaw, and the least, 0.33, at Farmville.—*E. A. Evans.*

Washington.—The mean temperature was 67.7°, or 2.4° above normal; the highest was 109°, at Fort Simcoe on the 20th, and the lowest, 32°, at Wenachee Lake on the 25th. The average precipitation was 0.55, or 0.05 below normal; the greatest monthly amount, 2.66, occurred at Tatoosh Island, while none fell at Fort Simcoe.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 70.9°, or 3.0° below normal; the highest was 100°, at New Martinsville on the 4th, and the lowest, 42°, at Beckley on the 27th. The average precipitation was 2.91, or 1.00 below normal; the greatest monthly amount, 5.93, occurred at White Sulphur Springs, and the least, 0.77, at Beckley.—*H. L. Ball.*

Wisconsin.—The mean temperature was 64.9°, or 2.4° below normal; the highest was 97°, at Gratiot on the 28th, and the lowest, 28°, at Crandon on the 19th. The average precipitation was 2.40, or 0.12 below normal; the greatest monthly amount, 5.25, occurred at Citypoint, and the least, 0.55, at Gratiot.—*W. M. Wilson.*

Wyoming.—The mean temperature was 65.6°, or 1.4° below normal; the highest was 101°, at Carbon on the 12th, and the lowest, 31°, at Atlantic City on the 25th. The average precipitation was 1.35, or 0.54 above normal; the greatest monthly amount, 2.60, occurred at Wheatland, and the least, 0.01, at Strong.—*M. G. Renoe.*

RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

The rivers are now very near their lowest, the stage of none exceeding 10 feet at the close of the month. A slight swell occurred in the lower Mississippi during the first half of the month, most marked at Vicksburg.

The highest and lowest water, mean stage, and monthly range at 112 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicksburg, on the Mississippi; Cincinnati, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

The following résumé of river stages and conditions of navigation in the respective streams is compiled from reports by the officials of the Weather Bureau at various river stations and section centers:

Hudson River. (Reported by A. F. Sims, Albany, N. Y.)—The Hudson was at its normal summer level during the first decade of August. During the night of the 10th and 11th heavy rainfall caused the Mohawk and Hudson rivers to rise 2 feet, and by the afternoon of the 11th tugs and steamboats had trouble in making landings. The dam at Boonville, N. Y., was swept away on the 11th, and the mills in that vicinity were badly damaged. The heavy rains in the Normanskill Valley, at the western end of Schenectady County, made the stream bank full, and, during the 11th, five bridges between Duanesburg and South Schenectady, N. Y., were carried away and the meadows covered with a deposit of gravel. The Hudson River reached the lowest point since the opening of navigation by the 22d. The heavy rains of the 23d and 24th on the upper Hudson watershed found its way to the tributaries within twenty-four hours, and caused turbidity in the tidewater portion of the Hudson. Practically no rain fell on the watershed during the last week of August, so that the end of the month finds a low stage of water in the Hudson between Troy and Coxsackie.

Susquehanna River and branches. (Reported by E. R. Demain, Harrisburg, Pa.)—Heavy showers during the latter part of July caused fair stages at the beginning of August in most of the streams of the Susquehanna system, and especially in the lower river, but the waters fell slowly and the month closed with low water throughout the system. Heavy local showers from the 20th to the 25th were followed by a slight rise in the river at Harrisburg and stations above. At Cedar Run and Sinnemahoning, on the west branch, the gauge readings were below zero during the entire month, and at Wilkesbarre, on the north branch, the water fell to a zero stage on the 10th, and ranged from zero to 1 foot below during the remainder of the month. The gauge readings for 14 reporting stations averaged 1.3 foot for the month, and the average rainfall for 17 stations was 3.0 inches.

Rivers of South Atlantic States. (Reported by E. A. Evans, Richmond, Va.; C. F. von Herrmann, Raleigh, N. C.; L. N. Jesunofsky, Charleston, S. C.; D. Fisher, Augusta, Ga.; and J. B. Marbury, Atlanta, Ga.)—The rainfall over the James River basin for the month, though somewhat in excess of the normal, caused no rise in the stream. A low and uniform stage of water prevailed during the entire month. The water was unusually clear all the month and was brackish at lower river points, where it is usually fresh.

During the month the rivers throughout North Carolina remained continuously low, and the ranges were extremely small. The precipitation at many points this year was less than during the remarkable drought of August, 1896, and the principal streams at the end of the month had fallen to the unusually low stages of last year. The Roanoke at Danville was below the zero of the gauge the greater portion of the month, and navigation did not extend above Hamilton. The lowest stage reached at Fayetteville, on the Cape Fear River, in 1896, was 1.9 foot on August 12, as compared with 2.3 feet on August 5, this year. No interruption of milling in consequence of present low stages has yet been reported.

The frequent and heavy rains over North Barnwell, Orangeburg, Aiken, Lexington, and Edgefield counties from the 14th to 22d produced a severe freshet along the entire length of the Edisto River from Johnston to Jacksonboro, continuing to the end of the month. On the 15th there was a 4.6 foot stage of water at Edisto; following this date, a steady, daily rise of nearly 0.2 foot occurred until the morning observation of the 26th, at which time the gauge registered 6.6 feet, or 0.1 foot above the danger line; by the morning of the 27th, the stream had receded 0.1 foot, and declined very slowly the remaining days of the month. The freshet reached Jacksonboro on the 27th, and proved a great loss to the rice planters on the lower river, coming at a time when the rice was ripening fast, and required the immediate drainage of the plantations for the purpose of harvesting. Thousands of acres of matured rice were spoiling for the want of drainage, which could not be effected because the stream was more elevated than the water in the rice fields. In some few instances on the low margin of the swamp lands, late corn was damaged to a limited extent. The Aiken Manufacturing Company's milldam, at Bath, was washed away on the 21st, and considerable damage was done to the roads in Orangeburg County.

The rainfall throughout the upper Savannah Valley was greater than the average amount, while in the immediate vicinity of Augusta it was more than double; the constant rain in this section from the 14th to the 23d was a source of much apprehension to the river planters. The critical period arrived on the 19th, when the river was beginning to feel the effects of the general rains above, and in consequence rose steadily until the 21st; it then fell 4.5 feet, but before night another rise was on, which culminated in a 20.4 foot river at Augusta on the early morning of the 22d. After this, to the end of the month, its fall was regular, but a few more feet on the 22d would have played havoc with the corn. Navigation was regularly carried on during the month, there being a marked increase in the carrying trade, both down and up stream, over that of last month. The stages have continued low in other Georgia streams, though there were several heavy rains at intervals.

Mobile River and branches. (Reported by F. P. Chaffee, Montgomery, Ala., and W. M. Dudley, Mobile, Ala.)—During the first half of the month, the rains were sufficient and so well distributed as to prevent any rapid decline in the Alabama and its tributaries, and a light draught stage was maintained. From the 16th to the 24th, continuous and, on some dates, heavy rains, caused the rivers to rise to decidedly higher than the average stage at this season, giving good boating stages during the latter half of the month, with a gradual decline in the rivers during the last week.

There was a gradual fall in the Tombigbee and its tributaries from the opening of the month to the 7th, when heavy rains on the 8th and 9th caused a steady rise, making good stages by the 15th. The rains on the 19th to 22d also produced a gradual rise.

Ohio River and branches. (Reported by F. Ridgway, Pittsburg, Pa.; H. L. Ball, Parkersburg, W. Va.; S. S. Bassler, Cincinnati, Ohio; F. Burke, Louisville, Ky.; P. H. Smyth, Cairo, Ill.; L. M. Pindell, Chattanooga, Tenn.; and H. C. Bate, Nashville, Tenn.)—Comparatively low stages of water prevailed in the upper Ohio throughout the entire month, although the larger packets were not forced to entirely suspend operations until the 23d. The lighter packets were not tied up until the last week of the month. The month closed with all navigation suspended on account of low water. The month opened with the wickets

in Davis Island Dam down; they were raised on the 4th, lowered on the 18th, and raised again on the 21st, remaining up for the balance of the month. No coal was shipped for southern ports during the month.

The rainfall over West Virginia during August was light and all the rivers showed slowly falling stages. The Great Kanawha River was, however, freely navigable until about the 25th, when the water became so low that the larger packets went to the bank. Navigation on the Little Kanawha was entirely closed after the 21st, in order that repairs could be made to the locks along the stream.

At Cincinnati, after a rise in the latter part of July, which prolonged the navigable condition of the river, and caused the longest period of uninterrupted navigation for many years, the river steadily fell during August. The month closed with a decidedly low river, lower than at any time during the season, and only the smallest craft could navigate. Menacing snags and sandbars appeared and put an end to navigation, which is now practically suspended.

While the average depth of water at Louisville for the month was only 5.4 feet, 1 foot lower than the month before, there was no interruption to navigation. The highest water was 8.5 feet on the 1st, then there was a steady decline until the 20th, when the lowest for the month, 4.1 feet, was reached. A slight rise occurred from the 21st to the 28th. At the close of the month the river was again falling slowly.

At Cairo the river fell steadily during the entire month. During the first decade the fall averaged 0.8 of a foot daily; during the second and third decades, 0.3 of a foot daily.

The Tennessee River remained navigable at Chattanooga to large boats during the first fifteen days of the month, and from the 18th to the 25th. At Kingston, Knoxville, and Bridgeport the river was low during the entire month, and only navigable to light draught boats. The rainfall during the month did not have much effect on the river, the precipitation being nearly all absorbed by the soil. Over the lower river, as far as Riverton, the stage was below the 3-foot mark for twenty-six days; the highest water was 5.0 feet, on the 1st. On the 31st the river was below the 1-foot mark at Riverton, Bridgeport, and Kingston.

The month opened with water in the Cumberland for navigation as far up as Carthage, but falling steadily. On the 6th, 7th, and 8th rains fell over the territory drained by the Cumberland's tributaries, and a good rise in the river was evident on the 7th at Carthage, and lower points on succeeding dates. Navigation closed above Nashville on the 15th, and, although the river has been open all the month to lower points, its present stage threatens to close it by September 10, at latest.

Mississippi River and minor branches. (Reported by P. F. Lyons, St. Paul, Minn.; M. J. Wright, Jr., La Crosse, Wis.; G. E. Hunt, Davenport, Iowa; F. Z. Gosewisch, Keokuk, Iowa; H. C. Frankenfield, St. Louis, Mo.; P. H. Smyth, Cairo, Ill; S. C. Emery, Memphis, Tenn.; R. J. Hyatt, Vicksburg, Miss.; R. E. Kerkam, New Orleans, La.; and C. Davis, Shreveport, La.)—Although the stage of water in the Mississippi river from St. Paul to La Crosse diminished considerably, still a satisfactory boating stage was maintained during the month, and the very satisfactory river traffic of the preceding month continued. The opinion is expressed by river captains that there has been much filling of the channel as a result of the spring flood.

The Mississippi River in the vicinity of La Crosse maintained a very satisfactory level, in view of the fact that such level was maintained by the natural flow of the river, and without the use of the reservoirs at the headwaters. For a number of years the river has been very low in August; even with the aid of the reservoirs a sufficient stage to make navigation possible was secured with difficulty. It is expected that the Government engineers will not direct the opening of the reservoirs this year until early in September. It will then take eight or ten days for the rise to be felt in St. Paul, and from that time on the reservoirs are expected to discharge sufficient to maintain a navigable stage for the balance of the season.

The month opened at this point with a stage of 8.5 feet on the gauge, the water rising up to the 5th instant, when a maximum stage of 9.0 feet was attained. From the 5th to the last day of the month the river steadily declined, reaching a minimum of 4.1 feet on the 31st. A serious obstacle to navigation developed during the latter part of the month at Rollingstone, a few miles above Winona, Minn. The packet *Quincy*, of the Diamond Joe line, made the discovery that there was scarcely 3.5 feet of water in the channel at Rollingstone. A bar had formed and the packet went aground. There was plenty of water above and below the bar. This bar was caused by the Chippewa River, which last spring washed down large quantities of sand. The Government engineers put a force of men to work on the bar, and by the end of the month it was reduced so as not to impede navigation, the stage of water having been increased to 5 feet.

The river at Keokuk fell almost steadily throughout the month. Navigation of the Des Moines Rapids was practically suspended by the 20th, with a stage of 3.1 feet at the upper end of the rapids, although a steamboat with a raft of logs in tow attempted a passage on the 28th. The logs struck on sunken rocks and the raft was broken up during the passage.

At the close of the month the water between Cairo and St. Louis was too low for steamboating, except in a light way. With a continued falling river it is very likely that by September 10 Cairo will be practically the head of navigation. Steamers up from the south will then have to transfer passengers and cargoes at this point to the several railroads, to be forwarded to their destination.

During the first three days of the month the river between Cairo and Memphis rose about 1 foot, the reading on the 3d being 16.4 feet at the latter point. On the 4th it began to fall, and the decline continued steadily up to the close of the month, when the stage of water was 10.4 feet lower than at the beginning of the fall. The gauge reading on the 31st was 6.0 feet, which is 2.7 feet below that of the same date in 1896, and 3.0 feet above that of 1895. The rainfall for this section was below the average, and was mostly confined to local showers. In some of the tributaries the water became so low at the close of the month that boating was somewhat difficult, but in the Mississippi a good boating stage was maintained throughout the month.

The rivers between Memphis and Vicksburg were low, as usual during the month of August, being lowest at the close of the month. Nothing of importance was noted in connection with the navigation of the rivers, except the closing of the mouth of the Yazoo by the sandbar which forms at that point during low stages of water, thus closing the lower Yazoo River to traffic until a rise occurs in that river or the Mississippi sufficient to clear the bar at the mouth. River business has been fair during the month, but the principal carrying trade will commence when the cotton season is fully opened later, although some cotton has already been shipped to market.

The fluctuations at New Orleans amounted to only 2 feet during the entire month. The Red and lower Ouachita continued at a low stage during the entire month, navigation being impossible, except for the lightest kind of craft. The stage at Alexandria was below the zero of the gauge during ten of the last fifteen days of the month, and the heavy rains of the week ending the 23d caused a rise of but 4 feet at that point.

Missouri River and branches. (Reported by L. A. Welsh, Omaha, Nebr., and P. Connor, Kansas City, Mo.)—The Missouri River continued to fall slowly and steadily throughout the month. The average stage of water was about 1 foot lower than that for a corresponding period during the past four years. The entire range of water at Omaha during the month was from 9.0 feet to 6.6 feet, or a fall of 2.4 feet. No further complaint has been heard of cutting at Plattsmouth, Nebr., or at Manawa, Iowa, and no information has been received of any unusual conditions of river during the month.

Arkansas River. (Reported by J. J. O'Donnell, Fort Smith, Ark., and F. H. Clarke, Little Rock, Ark.)—The river westward from Fort Smith was below a navigable stage and falling until the 8th; the heavy rain of the 8th and 9th caused a rise from 2.0 to 8.9 feet on the morning of the 10th at Fort Smith. From this date it fell steadily until the end of the month, excepting a rise of 1.2 foot on the morning of the 20th. The river was navigable west of Fort Smith only from the afternoon of the 9th to the 13th.

Navigation of the river was pursued uninterruptedly from Little Rock to the mouth during the entire month, but was suspended between Little Rock and Dardanelle on account of low water from the 1st to 9th, from the 17th to 21st, and from the 26th to the end of the month.

The decline in the river, that set in on July 25, continued until August 8, when the river began rising at Fort Smith; it rose at Dardanelle on the 10th, 11th, and 12th, and at Little Rock on the 11th, 12th, and 13th, the total rise being 6.9 feet at Fort Smith, 6.8 feet at Dardanelle, and 5.5 feet at Little Rock. The river then declined steadily until the 20th, when a slight rise appeared at Fort Smith, which was felt at Dardanelle on the 21st and 22d, and at Little Rock on the 22d to 24th, the river then declining steadily to the end of the month.

Rivers on the Pacific Coast. (Reported by W. H. Hammon, San Francisco, Cal., and J. A. Barwick, Sacramento, Cal.—The Sacramento River at Sacramento has ranged between 10.0 and 8.6 feet. With the latter stage there is some trouble in navigation a short distance below the city, from the formation of sandbars caused by slickens from the hydraulic mines in the mountains. Usually navigation has not been obstructed until the gauge at this point indicated a stage of from 7 to 7.6 feet, at which time navigation would be obstructed at several points between Sacramento and the mouth of the river. The water has entirely receded from the arable lands in the tule basins, which land is now covered with a good growth of grass, beans, potatoes, corn, and buckwheat. The river at this point usually reaches its lowest stage in September. During dry autumns the low stage continues until the early part of December. The lowest stage in the past twenty years was 6 feet in November, 1879.

Heights of rivers above zeros of gauges, August, 1897.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn.	1,957	14	8.9	1	4.5	30,31	6.2	4.4
Reeds Landing, Minn.	1,887	12	7.4	1,2	2.9	31	4.9	4.5
La Crosse, Wis.	1,822	10	9.0	4,5	4.1	31	6.5	4.9
North McGregor, Iowa	1,762	18	9.2	6-9	3.9	31	6.9	5.3
Dubuque, Iowa	1,702	15	8.8	7-11	3.8	31	6.9	5.0

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
Mississippi River—Cont'd	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Leclaire, Iowa	1,612	10	5.8	1	2.5	31	4.6	3.3
Davenport, Iowa	1,596	15	7.2	1	3.4	31	5.7	3.8
Keokuk, Iowa	1,466	14	7.4	1	2.8	31	5.5	4.6
Hannibal, Mo	1,405	17	8.7	1	4.0	31	6.7	4.7
Grafton, Ill	1,307	23	9.9	1	5.0	31	7.6	4.9
St. Louis, Mo.	1,264	30	13.8	1	7.1	31	10.5	6.7
Chester, Ill.	1,189	30	10.2	1	5.3	31	7.8	4.9
Cairo, Ill	1,073	40	23.6	1	9.1	31	14.7	14.5
Memphis, Tenn	843	33	16.4	3	6.0	31	10.5	10.4
Helena, Ark	767	44	22.6	4,5	8.8	31	15.4	13.8
Arkansas City, Ark	635	42	22.2	6	9.4	31	15.9	12.8
Greenville, Miss	595	40	18.1	7	7.6	31	13.0	10.5
Vicksburg, Miss	474	41	20.6	8,9	8.8	31	15.2	11.8
New Orleans, La	108	16	5.7	10	3.6	29,30	4.8	2.1
Arkansas River.								
Fort Smith, Ark.	345	22	8.9	10	1.9	7	3.3	7.0
Dardanelle, Ark.	250	21	7.6	12	0.8	7-9	2.2	6.8
Little Rock, Ark.	170	23	9.2	13	3.4	9	4.7	5.8
White River.								
Newport, Ark	150	21	2.2	10	0.8	30	1.4	1.4
Illinois River.								
Peoria, Ill	135	14	4.7	1	3.7	24	4.0	1.0
Missouri River.								
Bismarck, N. Dak.	1,201	14	5.1	1	2.7	31	3.8	2.4
Pierre, S. Dak.	1,006	14	4.6	1-3	2.3	31	3.4	2.3
Sioux City, Iowa	676	19	8.3	1	7.0	31	7.5	1.3
Omaha, Nebr.	561	18	9.0	1	6.6	31	8.0	2.4
St. Joseph, Mo.	373	10	4.2	1-3	2.2	31	3.4	2.0
Kansas City, Mo.	280	21	10.0	1,4,5	7.2	31	8.7	2.8
Boonville, Mo.	191	20	9.5	8	7.3	31	8.1	2.2
Hermann, Mo.	95	21	5.0	8	1.7	31	3.4	3.3
Ohio River.								
Pittsburg, Pa	966	22	7.0	6	3.0	4	5.3	4.0
Davis Island Dam, Pa.	960	25	6.8	19	2.9	29,31	4.5	3.9
Wheeling, W. Va.	875	36	7.8	20	3.0	30,31	5.2	4.8
Parkersburg, W. Va.	785	35	8.8	1	4.2	31	6.2	4.6
Point Pleasant, W. Va.	703	36	9.2	1	2.9	31	4.9	6.3
Catlettsburg, Ky	651	50	13.2	1	3.5	31	6.7	9.7
Portsmouth, Ohio	612	50	14.2	1	5.2	31	8.0	9.0
Cincinnati, Ohio	499	45	18.0	1	7.5	31	10.3	10.5
Louisville, Ky.	367	24	8.5	1	4.1	20	5.4	4.4
Evansville, Ind	184	30	17.0	1	5.0	24,25	8.3	12.0
Paducah, Ky.	47	40	15.4	1	3.2	25	6.9	12.2
Alleghany River.								
Warren, Pa	177	7	1.0	16-18	0.3	30,31	0.6	0.7
Oil City, Pa	123	13	3.6	17	0.7	31	1.7	2.9
Parkers Landing, Pa.	73	20	5.0	18	0.8	30,31	1.8	4.2
Freeport, Pa.	26	20	7.7	18	1.7	31	3.4	6.0
Conemaugh River.								
Johnstown, Pa.	64	7	2.2	11	0.8	29,30	1.3	1.4
Red Bank Creek.								
Brookville, Pa.	35	8	0.1	1	— 0.5	4-15, 24-31	—0.4	0.6
Beaver River.								
Ellwood Junction, Pa.	10	14	0.8	1	— 0.3	31	0.1	1.1
Cumberland River.								
Burnside, Ky	434	50	4.4	7	0.7	22	2.1	3.7
Carthage, Tenn	257	30	6.5	7	1.7	21	2.9	4.8
Nashville, Tenn	175	40	7.4	8	2.4	22	4.3	5.0
Great Kanawha River.								
Charleston, W. Va.	61	30	5.2	10	4.0	22	4.6	1.2
New River.								
Hinton, W. Va.	95	14	2.4	9	1.2	31	1.6	1.2
Licking River.								
Falmouth, Ky.	30	25	2.5	17	1.0	14,15, 30,31	1.6	1.5
Miami River.								
Dayton, Ohio	69	18	1.7	2,5	1.0	21-23	1.3	0.7
Monongahela River.								
Fairmont, W. Va	119	25	4.8	11	— 0.1	23,24	0.9	4.9
Greensboro, Pa.	81	18	9.8	5	7.1	22-25	7.8	2.7
Lock No. 4, Pa.	40	28	11.0	6	5.9	22-24	7.9	5.1
Cheat River.								
Rowlesburg, W. Va.	36	14	6.4	4	1.8	18-25, 30,31	2.6	4.6
Youghiogheny River.								
Confluence, Pa.	59	10	2.4	5	0.1	29-31	0.6	2.3
West Newton, Pa.	15	23	1.9	6	0.0	29-31	0.5	1.9
Muskingum River.								
Zanesville, Ohio	70	20	6.1	1	5.0	29	5.5	1.1
Tennessee River.								
Knoxville, Tenn.	614	29	3.2	9	1.2	29,30	1.8	2.0
Kingston, Tenn	534	25	2.9	9	0.4	30	1.4	2.5
Chattanooga, Tenn.	430	33	5.6	10	2.1	31	3.5	3.5
Bridgeport, Ala	390	24	3.5	10,11	0.9	31	1.9	2.6
Florence, Ala.	220	16	3.8	1	1.0	30,31	1.9	2.8
Johnsonville, Tenn.	94	21	8.2	1	2.1	31	3.4	6.1
Clinch River.								
Speers Ferry, Va.	156	20	2.0	7	— 0.2	21,30	0.3	2.2
Clinton, Tenn	46	25	......	......	......	......	......	......
Wabash River.								
Mount Carmel, Ill	50	15	2.9	1	1.2	19-21, 24-31	1.8	1.7
Red River.								
Arthur City, Tex.	688	27	7.1	20	3.9	31	5.2	3.2
Fulton, Ark	565	28	6.0	1	3.2	29-31	4.0	2.8
Shreveport, La.	449	29	5.0	1	0.5	22,23	1.8	4.5
Alexandria, La	139	33	3.4	4	— 1.6	18	0.8	5.0
Atchafalaya Bayou.								
Melville, La.[1]	100	31	17.5	11,12	9.6	31	14.8	7.9
Ouachita River.								
Camden, Ark.	340	39	5.7	15	3.2	8-10, 30,31	3.8	2.5
Monroe, La	100	40	1.9	20,21	0.8	13,14,31	0.9	1.1
Yazoo River.								
Yazoo City, Miss.	80	25	2.4	21	— 0.7	10,31	0.4	3.1
Chattahoochee River.								
Columbus, Ga.[2]	140	20	7.8	20	0.6	6	2.5	7.2
Flint River.								
Albany, Ga.	80	20	7.2	27	0.9	7	3.1	6.3
Cape Fear River.								
Fayetteville, N.C	100	38	6.8	8	2.2	5	3.9	4.6
Columbia River.								
Umatilla, Oreg	270	16	10.4	1	7.9	31	8.7	2.5
The Dalles, Oreg	166	40	16.2	1	11.8	31	13.0	4.4
Willamette River.								
Albany, Oreg	99	20	1.3	1-3,10-12	1.0	23-31	1.1	0.3
Portland, Oreg	10	15	8.1	1	4.6	22,24	6.0	3.5
Edisto River.								
Edisto, S. C	75	6	6.6	26	2.2	6,7	4.6	4.4
James River.								
Lynchburg, Va.	257	18	0.6	6	— 0.1	15,19-22,31	0.1	0.7
Richmond, Va	110	12	0.3	5	— 0.5	21-24	0.3	0.8
Alabama River.								
Montgomery, Ala	265	35	6.3	23	0.5	6,7	1.9	5.8
Selma, Ala	212	35	8.2	24	0.0	8	2.3	8.2
Coosa River.								
Gadsden, Ala.[3]	144	18	2.2	19	— 0.1	30	0.8	2.3
Tombigbee River.								
Columbus, Miss	285	33	— 0.2	13	— 3.2	6,7	—2.1	3.0
Demopolis, Ala	155	35	2.8	14	— 1.5	8	0.1	4.3
Black Warrior River.								
Tuscaloosa, Ala	90	38	3.2	11,12	0.2	7,8	1.2	3.0
Pedee River.								
Cheraw, S. C	145	27	6.8	9	1.4	19	2.5	5.4
Black River.								
Kingstree, S.C	60	12	6.9	31	4.0	1	5.3	2.9
Lumber River.								
Fair Bluff, N.C	10	6	5.1	1,2	2.0	31	3.4	3.1
Lynch Creek.								
Effingham, S. C	35	12	8.8	1	2.9	31	5.2	5.9
Potomac River.								
Harpers Ferry, W. Va.	170	16	1.7	26	0.3	23	0.8	1.4
Roanoke River.								
Clarksville, Va	155	12	1.0	21	0.2	29-31	0.5	0.8
Sacramento River.								
Red Bluff, Cal	241	23	0.1	1-27	0.0	28-31	0.1	0.1
Sacramento, Cal	70	25	10.0	1	8.6	27,28	9.2	1.4
Santee River.								
St. Stephens, S. C	50	12	7.3	1	3.2	6,7	5.4	4.1
Congaree River.								
Columbia, S. C	37	15	3.5	23	1.5	1-5, 8-22, 24-31	1.6	2.0
Wateree River.								
Camden, S.C	45	24	12.5	12	3.0	30	4.6	9.5
Savannah River.								
Augusta, Ga	130	32	20.3	22	5.3	16,31	8.4	15.0
Susquehanna River.								
Wilkesbarre, Pa.	178	14	4.0	1	— 1.0	15-21	0.3	5.0
Harrisburg, Pa.	70	17	4.3	2	1.2	22-24	2.1	3.1
Juniata River.								
Huntingdon, Pa	80	24	4.0	11	2.8	29-31	3.1	1.2
W. Br. of Susquehanna.								
Williamsport, Pa	35	20	3.5	24	0.7	31	1.8	2.8
Waccamaw River.								
Conway, S. C	40	7	2.6	9	1.0	20,21	1.9	1.6

Late report, July, 1897.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
Roanoke River.								
Clarksville, Va	155	12	2.2	21	0.7	28	7.7	1.5

[1] Distance to the Gulf of Mexico.
[2] Report missing on 10th.
[3] Reports missing on 15th and 16th.

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THE ROENTGEN RAYS.

By Prof. JOHN TROWBRIDGE (from the Harvard Graduates Magazine for June, 1897).

The investigations in the Jefferson Physical Laboratory of Harvard University on the subject of the Roentgen rays have been directed to the more purely scientific side of the question of discharge of electricity through gases, a subject of which the Roentgen rays is only a part. The most familiar example of the discharge of electricity through gases is a stroke of lightning. This discharge develops, so to speak, a current of electricity which is similar to that by means of which we telegraph or telephone, but its duration is extremely short. In its passage it encounters a resistance *in the air* instead of *on a telegraph wire*. Moreover, it passes to and fro or oscillates, and the time it takes to make an excursion in one direction is barely a millionth of a second, while the to and fro motions on a telephone wire are nearly a thousand times slower. When the lightning discharges take place in the higher regions of the air, where the air is highly rarefied, we have instead of the zigzag white flash of lightning the red and yellow auroral streamers. All of these manifestations of the discharges of electricity can be imitated in a laboratory, and by exhausting glass tubes of almost every trace of air we at length obtain a discharge of electricity which produces the Roentgen rays.

There is no break in the continuity of the phenomena of electricity from the current by means of which we telegraph and telephone, through the various manifestations of lightning and the northern lights, up to the production of the Roentgen rays; and it may be that the corona of the sun, with its strange streamers which are only visible during an eclipse of the sun, is a manifestation of the discharge of electricity, and that the earth is one pole of a species of electrical machine and the sun the other pole, and that in our whirling through space we pass through great streamers of the corona and are conscious of electrical disturbances in the form of northern lights; and it may be that the physical and mental conditions of humanity are, influenced in ways unsuspected by the changes in our electrical condition.

When we thus consider the phenomena of the discharge of electricity through gases, we see that the manifestation of the Roentgen rays, in revealing the skeleton of the human body, is only a comparatively small phenomenon in a great subject which involves the life of the human race; for light and heat are now considered as electrical phenomena, and it is impossible to find a space on this earth which is free from electromagnetic waves, unless, indeed, we place ourselves in a hermetically sealed lead or iron chamber from which all air has been exhausted. Thus it may be said that life and electricity die together.

In order to study the energy manifested by the Roentgen rays, I have had constructed a storage battery of ten thousand cells, which I believe is the largest storage battery at present in existence. The object of such a battery is to obtain a steady source of electricity. Each cell of this battery develops a certain amount of electricity, which can be closely estimated. When the battery is exhausted it is readily recharged by a dynamo, and one can by its means exhibit all the phenomena of electricity from the Edison filament lamp, the arc light, the phenomena of magnetism, and the dis-

charges of electricity through gases. A discharge of electricity in the shape of a flame three feet high can be obtained by connecting the ends of the battery and suddenly separating them, and it is highly dangerous to touch the terminals of the battery, since the voltage or electrical pressure amounts to 20,000 volts. This pressure can be exalted almost to any extent. I have used from 300,000 to 500,000 volts.

With this battery I have ascertained that it requires about 100,000 volts to produce the Roentgen rays, and the energy required amounts to about 3,000,000 horse power acting for one-millionth of a second. The duration of this exhibition of energy is exceedingly short and, therefore, the work if spread over a second would seem very small. Nevertheless, we perceive that the shock given to the molecules of matter must be extremely powerful; and we can understand why the Roentgen rays can pass through blocks of wood more than a foot thick, can penetrate human flesh, and can blacken photographic plates in dark rooms at least sixty feet away from the little Crooke's tubes in which the rays are generated.

The most interesting fact, however, which I have discovered is this: When the Roentgen rays are being developed with the greatest intensity, the discharge of electricity encounters very little resistance in passing through the attenuated space inside the Crooke's tubes. It has been believed hitherto that a vacuum can not conduct electricity. My experiments, however, lead me to conclude that under certain conditions it can be made to conduct, and that it offers hardly any resistance to a disruptive discharge of electricity. When the discharge is started it appears to go with the greatest ease. This fact leads to interesting suppositions in regard to the structure of the ether of space. The discovery of the Roentgen rays has given a great impulse to the subject of the discharge of electricity through gases, and the Jefferson Physical Laboratory has now important means and methods of studying the great problem of the mechanism of this discharge of electricity in rarefied media.

ON THE MECHANICS OF THE KITE.[1]

By HORACE M. DECKER, B. S., Irvington, Essex Co., N. J. (dated December, 1896).

The kite as a motor for ascension depends on the dynamic effects of the impulse of wind on plane surfaces.

The pressure of wind on a plane surface at right angles to the direction of motion is given by the well-known equation

$$P = k\, a\, w\, h, \qquad (1)$$

which measures the inertia of the column of fluid encountered. a is the area of the plane in square feet; w is the weight of a cubic foot of air which may be taken in ordinary as 0.08 pound avoirdupois; $h = v^2 \div 2g$ is the "head" of the current. The coefficient k has been determined by different experimenters to be about 1.70 for average wind velocities. The average of the writer's experiments is 1.72. Of course the value of the factor w will vary somewhat with the ordinary thermic and barometric changes and the value of k should increase with the velocity. However, the above approximations are good in ordinary conditions.

When the plane is inclined to the direction of the current like a kite, the previous relations are curiously changed. Both the pressure normal to the plane and its center of application, which was the center of area, vary with the contour or form and the degree of inclination.

[1] In accordance with the policy of publishing the views of those who have written on the theory of the kite, the Editor is permitted to reproduce, herewith, the essay of Mr. Horace M. Decker, whose graduating thesis with experiments on the resistance of the air formed an early contribution to meteorology in its relation to engineering.

To Duchemin is due the following equation for wind pressure on inclined planes:

$$P_n = P_{90} \frac{2 \sin \alpha}{1 + \sin^2 \alpha}$$

P_n is the resultant pressure normal to the plane, while P_{90} is the pressure on the plane, when at right angles to the current, as given by equation (1); α is the inclination of wind to the surface of the plane.

Duchemin's determination gives results closely confirmed for a square plane by experiments made in London by Wenham for the English Aeronautical Society and by those of S. P. Langley. The first and last results are presented by the curves of Fig. 1, Chart VI. The influence of the form of the plane is shown by the curves of relative pressures in Fig. 2, as determined by Langley, for plates of the same area but different proportions.

In making kites the square or approximations thereto are more common and with these forms the pressure will follow closely enough the law of Duchemin. A curve of the values of Duchemin's factor for the normal pressure is given in Fig. 3, as also curves for the ratio of the horizontal and vertical components $P_{,}$ and $P_{,,}$ respectively. Fig. 4 shows the position of center of pressure d/l with varying degrees of inclination for a square plane as determined by different experimenters, where d is the distance between the center of area and center of pressure for varying angles of inclination and l is the length of the side of the square plane. Where the form is other than rectangular, special figuring by areas must determine the approximate values of d.

In the kite we find a static couple about the center of pressure and stable equilibrium because the center of gravity of the plane is carried below the center of pressure either by the form or by the addition of ballast.

In Fig. 5, let P_n be the normal pressure, $P_{,}$, $P_{,,}$ are its components, s is the string, $S_{,}$, $S_{,,}$ are the components of its tension, W represents the total weight of the plane and its ballast acting from the center of gravity (w). Supposing the interbalance of forces to be complete and the plane in stable, uniform flight, then

$$Wd = S_{,,}\, d_{,} \qquad (2)$$

$$S_{,} = P_{,} \qquad (3)$$

$$W + S_{,,} = P_{,,} \qquad (4)$$

and approximately the line tension

$$S = \sqrt{P_{,}^2 + (P_{,,} - W)^2} \qquad (5)$$

The center of gravity of the plane is usually near its center of area. With ballast the center of gravity will be lowered by the distance x,

$$x = l \frac{W_{,,}}{W_{,} + W_{,,}} \qquad (6)$$

Where $W_{,}$ is weight of plane and $W_{,,}$, the weight of ballast, l, being the distance between the centers of gravity. But as the tail will be blown back at an angle t with the vertical and partly supported by wind pressure, therefore

$$W_{,,} = W_t - P_t \sin t.$$

where P_t is the pressure normal to the tail. The relation

$$\sqrt{W_t^2 + (W_t \sin t)^2} > P_t$$

must exist if the tail is to have much effect on the plane at ballast. If the wind pressure does overcome the weight of the tail, the kite will begin to fall spinning, and then ballass presenting less cross section must be chosen.

It is evident that the line tension S is measured by the deflections due to wind pressure and the weight of the cord. The value of the components of these forces may be determined (by an impracticable equation), but it is enough to say that with a continued paying out of line, the kite will

rise, with an ever increasing deflection in the cord and decreasing angle of flight, to a certain point of maximum altitude beyond which more line will sag to the earth. This is where the components of the weight and wind pressure due to the line, with maximum deflection, are in excess of $S_{,,}$ as given by equation (5).

Practical trial will determine the characteristics of a type in a short time, where mathematics would be unavailing. Many points treated here generally can be specifically determined by comparison only.

The kite which exposes the greatest area for a given weight of plane, ballast, and cord will have the most carrying capacity. The area of plane divided by the weight of plane will be some measure of the efficiency. But the form of plane and method of suspension are also of importance as influencing the angle of flight and steadiness.

In Eddy's design, a diamond-shaped kite of equal dimensions, the frame crossing at four-fifths the height of the upright, we have provision made, by convexing the frame and bagging the covering, for obtaining sufficient metacentric height without ballast in the form of tail or steadying fins.

The statics of kite are analogous to those of a ship. The vertical distance of the centers of pressure and weight might be called the metacentric height.

Eddy's kite, besides its motor efficiency, has other advantages. The form, triangular, with the base uppermost, gives small range to the center of pressure, therefore enabling an adjustment for raising conditions to hold well into high angles of flight. And the kite itself is a model of compactness, simplicity, strength, and low cost combined with the efficiency needed in high angle flying.

Multiplane kites, like the cellular Hargrave, are less efficient, because according to Mr. Langley's experiments, two superposed planes must be separated nearly their whole width in the direction of the wind motion to obtain the pressure due to their area, and the weight of the lateral partitions counts to disadvantage. Advantages for this special construction are claimed in the way of steadiness, which is probably due to the inertia of the columns of air flowing through the cells. This kite is not in stable equilibrium, as its natural center of gravity is above the centre of pressure of the lower planes which do most of the work.

The little Japanese bird kite will fly fairly well without ballast. The baggy form and flexibility of its wings carry the center of pressure above the center of gravity. But the angle of flight is low owing to the inefficiency of the surface. It is probable that this kite also realizes a steadying influence from the action of the currents of air, in the wing vents. All kites, especially the plane forms, are subject to considerable oscillation while in action, and in the aeroplane ship, where this vibration would be a factor, this idea of utilizing the inertia of air columns may be of advantage.

A kite may rise with the string fastened direct to the framework above the center of pressure, but the use of two or more conductors joining the frame with the line distributes the strains, insures steadiness, and gives self-adjustment in a degree. Call a point on the plane of the kite opposite to this connection, and in a line with the string, the center of suspension. The kite may rise, but if the center of suspension is too high, or if $S_{,,}\, d_{,} > w\, d$ at any angle of flight or ordinary position of plane, the kite will pull over, flounce, and fall. On the other hand, if the center of suspension be too low, or approach too near the center of pressure in any condition, the kite will rear or surge up and dive. These conditions may often be brought about by the wind itself. Air, because of its compressibility, is seldom a steady stream in motion, but consists of waves or impulses of varying velocity and direction, thereby producing glancing or darting in the kite.

In a well-designed kite there are rather wide limits for the position of the center of suspension within which a change only influences the angle of flight in a degree. That is, the kite with a given adjustment of connection, within these limits, will go safely and self-regulating through wide angles of inclination and flight. The length of the conductors or the distance of the point of suspension from the plane is also an important adjustment, since the amount of change in the position of the center of suspension subtended by a given change of angle of inclination is dependent on this length, and lack of adjustment in this particular will limit the angle of flight.

In general, the forces in action will vary with the square of the wind velocity, and the tension at the point of observation will decrease, for a given wind velocity and length of line, more or less closely with the cosine of the angle of flight. The bird, the prototype of the kite, presents many perfect analogies. In sailing flight the component $P_{,,}$ of the air pressure on its wings is balanced by the action of gravity, while $P_{,}$ represents the de-accelerating force on its mass, or the resistance to motion. The weight of the bird is comparable to the weight of the kite W, plus the vertical component of the line tension $S_{,,}$. And $S_{,}$ may be compared to the momentum, or, at times, the relative inertia of the bird. Again, the great disproportionate spread of wing to breadth in the best sailers is a natural proof of the law involved in the curves of Fig. 2.

HIGHS AND LOWS.

By N. R. TAYLOR, Observer, Weather Bureau (dated September 21, 1897).

Those who make a study of the weather maps issued by the United States Weather Bureau will doubtless read this article with at least passing interest. Although it is not an easy matter to write intelligently upon a scientific subject without scientific words creeping in, yet it is the intention to make this article plain without imperiling the subject, and to avoid all terms that would tend to confuse.

Besides the lines representing barometric pressure in inches and temperature in degrees, the maps contain the words "High" and "Low," every map showing at least one of each. These highs and lows are the most conspicuous features on the maps, and, it might be added, the least understood by the casual observer.

A whole chapter could be written upon the weather conditions represented by the lines, or curves, inclosing high and low areas, but this paper will suffice to give the reader a general idea of their importance in forecasting the weather.

As the words high and low imply, one is the opposite of the other, and they are used on the weather maps to designate the centers of those areas over which a relatively high or low reading of the barometer is observed. These areas of pressure are inclosed by isobaric lines, and include that part of the country over which the pressure is highest or lowest, as the case may be, when compared with other sections, and their centers are located where the greatest or least barometer reading has been observed. It will be seen that the words "High" and "Low" are comparative terms, hence when a high or low pressure is noted on the border of the territory covered by the weather maps, their areas are not sufficiently defined to admit of their centers being accurately located, in which case the highest or lowest pressure observed is quoted, and the isobars are then in the form of short curves.

The lines running through places of equal pressure, showing the different barometric heights, are aptly illustrated by the contour lines employed by civil engineers to mark the relative altitudes of various points.

A glance at a few characteristics of highs and lows and

their effects upon the weather conditions will show their importance from the forecasters point of view.

A high, from the time it first appears, moves in a general easterly direction over well known tracks, with a velocity dependent upon the conditions surrounding it. Sometimes, however, its movement is so sluggish as to be hardly perceptible, and it hangs over a section of the country with a persistency that both surprises and confuses the forecaster. These cases are rare, and one noticing a high charted on this morning's weather map may look for it tomorrow at a point farther east, and so on, until it moves out of range of the Weather Bureau stations.

An area of high pressure when once formed can be counted upon to last for some time. This being so, and from the fact that air is continually flowing out from all sides as surface winds, it is evident that to maintain its characteristics air must be supplied from some source in proportion to that which flows out. Hence it would seem that in the higher strata of the atmosphere air must be moving inward and sinking downward, thus making it reasonable to believe that the pressure in the upper regions of the air is least above the spot where it is greatest on the earth's surface.

During the summer months areas of high pressure are characterized by dry weather; the days are warm, bright, and cloudless. The nights are cool, with clear and brilliant skies; and, as the dry air aids radiation from the earth's surface, the temperature quickly cools to the dew point, and heavy deposits of dew occur, and sometimes frost. Under these conditions the daily range of temperature is generally much greater than at other times.

Areas of high pressure during the winter months are more decided in their characteristics; they move with greater speed, and as the days are short and insolation weak, they are generally attended by low temperatures. Cold days and colder nights prevail.

The blizzards that sweep with icy breath over the west and northwest, the marrow-chilling northers of Texas, and all the cold waves are first located within areas of high pressure, and, as they advance with the frosty breath of colder climes, the forecaster notes their position and studies their progress.

As has been stated, the low is the opposite of the high, and it plays an equally important part in our weather changes. The air in the center of an area of low pressure being rarer, and consequently lighter than under ordinary conditions, tends to disturb the equilibrium of the surrounding air, causing it to expand and rush toward the low.

The term "cyclone" was originally applied to lows and storm areas for the reason that it was believed the wind blew around them in circles, but since the science of meteorology has advanced it has been demonstrated that the wind blows in toward the low's center in a spiral curve with a velocity dependent upon the gradient or steepness of the depression. As the center of an area of low pressure remains the lowest in spite of the fact that the surface winds are pouring in from every direction, the logical deduction is that the air must rise around the center and flow out from above, thus making an inward and upward whirl, or eddy, of the atmosphere. The eddy, however, is not stationary but is always moving, sometimes increasing in strength as it advances and again spreading out and becoming less intense.

The weather changes associated with a low are proofs of its being an eddy of ascending air from the fact that on its approach clouds are formed, the temperature rises, and often rain, accompanied by high winds, occurs. Then comes clearing weather, a sudden shift of wind, and a sharp rise of barometer, all showing that the storm has passed and that a high, with its quota of fair weather, will soon move in and assume control.

Like the restless billows of the ocean, the atmosphere is ever surging, and pursuant to the wise and economic laws of nature, compensates us with clear and sunny skies for the days that were dark and dreary.

NOTES BY THE EDITOR.

ORIGIN OF DESCENDING GUSTS OF WIND.

Mr. Charles A. Love, voluntary observer at Aurora, Ill., writing with reference to a storm at Laurelwood Park, 1 mile north of Batavia and 8 miles north of Aurora, suggests an experiment that might be carried out on a small scale in a laboratory, if any of the physicists who have the necessary conveniences at hand would kindly devote so much attention to meteorological problems. Mr. Love says:

> A visit to the place showed that a hard windstorm from the southwest had swept through the grove at Laurelwood Park in the afternoon of August 28, and that the damage had been confined for the most part to a limited portion of the natural grove of tall black oaks of about a quarter of a mile in extent each way. * * * The branches of the trees fell toward the northeast, and the roof of the dancing pavilion was pushed eastward. If the wind had been a lifting one it should have carried the roof clear of the floor, but it did not do so, and in this case as in others where hail falls, the wind appears to have been crushing instead of lifting. Reports from Kaneville, about 12 miles southwest from Laurelwood Park, report a wind, rain, and hailstorm at 5:25 p. m. from the southwest. First, there was a cold gust from the northwest, and then the wind veered to the southwest. Is it possible for a stratum of cold dry air to get in between an upper and lower rain cloud and freeze the rain from the upper cloud while falling through the cold dry stratum, if such a stratum be between 800 and 2,500 feet deep? I should like an opportunity to let water drops fall from some very high building and observe how great a falling distance and how low a temperature of the air is required to produce hail. The downward rush of cold air displacing the hot air at the surface of the ground appears to account for the peculiar crushing and pushing of the wind in the storm at Laurelwood.

Approximate calculations of the power of cold rain and hail to cool the air and cause it to descend are said to show that only gentle winds can be formed in this way. The Editor hopes that well-devised experiments may be instituted in order to test these calculations. The subject is too difficult and too important to meteorology to be settled by crude estimates.

THE POSTAL TELEGRAPH CLOCK AND WEATHER BULLETIN.

According to the Electrical Engineer of September 2, the Postal Telegraph Cable Company is in cooperation with the United States Time and Weather Service Company of New York, and is making rapid headway in the establishment throughout the city of tall handsome clocks which shall exhibit standard time, not only by the face of the clock but by the dropping of a time ball at noon, so that "Postal Time" is already becoming a standard well-known phrase. These clocks have been set up already in many western cities also, and will undoubtedly meet a popular want.

The clock is within a case about 18 feet high, which is surmounted by a short staff supporting a wind vane, and down which a gilded ball drops about 3 feet each day at noon. Over the clock dial is the name of the "Postal Company." Under the dials are large panels about 18 by 63 inches, which are filled up with local and special advertising. Beneath these are smaller panels which give each morning the latest Weather Bureau reports and forecasts two or three hours be-

fore they appear in the afternoon papers. At the corners of the stand, on the street side, are a thermometer and a barometer. The clock stands are made of cast iron, bolted securely to the sidewalk paving. Arrangements are made, when necessary, to illuminate by electricity the clock faces and the advertising panels. The whole arrangement reminds us of the so-called Urania Columns established by the Urania Gesellschaft in Berlin, and they will doubtless be as popular in America as they have become in Germany.

ELECTRIC WAVES IN THE ATMOSPHERE.

In the MONTHLY WEATHER REVIEW for November, 1896, XXIV, p. 409, there are some remarks by Prof. John Trowbridge on the possibility of detecting the transmission of electric waves from the sun to the earth. All wave phenomena have certain points of analogy. Our eyes and ears are simply machines for catching optical and acoustical waves; as a tide mill can be arranged to abstract power from the ocean waves, so, also, the electric current may be treated if it behaves like a wave-like phenomenon. The flow of a current of water thrown into waves by an obstacle is analogous to the flow of electricity. The following remarks are taken from a report by Charles de Kay, United States consul-general at Berlin, in the consular reports for September, 1897:

The electrical waves are not believed to be vibrations in the air itself, but rather in the ether between the particles of air; as compared to light waves, they are of enormous size.

That the electric waves do in many ways act like light rays, though they are much longer, I saw recently demonstrated in a lecture I was permitted to attend at the Polytechnic School in Charlottenburg, Berlin. To get some idea of the relative size of electric waves when compared with those of light, imagine that the light waves are represented by the width of the Hudson River at New York City; then the electric waves would be represented by the Atlantic Ocean and Baltic Sea, say from New York to St. Petersburg, or, to express it acoustically, the waves of light are so high and sharp, while those of electricity are so long and deep, that the light waves may be compared to the highest, shrillest sound which the human ear can grasp, while those of electricity are comparable to the deepest diapason note of an organ.

The lecture alluded to was one which Professor Rubens, a young German of Dutch descent, now employed as instructor at the Polytechnic, recently gave to a number of teachers. Since Herz's death, in 1888, he said, much progress has been made in reducing the size of the electric-wave generator. As the size of the apparatus has a relation to the length of the electric waves, and as it was desirable to shorten these waves, the decreased size of the apparatus has been of use in making air telegraphy more practicable. Shorter electric waves are more approximate in their action to waves of light and go farther. Up to the present the shortest are those of the Russian experimenter, Lebedeff, who has produced them from 6 to 7 millimeters long. Professor Rubens showed a thermo element, or heat catcher, invented by himself to take the place of Marconi's coherer, which, like the coherer, catches the refracted and focused electric rays. The spark, he observed, was not at all a necessary phenomenon in electricity. He then made many curious experiments to show the similarity in action of waves of light and waves of electricity, and also drew attention to the very different way in which electric and light waves pass through different substances; thus, he reflected electric waves like light, refracted them with prisms, and diffracted them with a wire grating of parallel wires, as light is diffracted by Rowland's gratings. He then showed the polarization of these rays, freely through the fibers of wood longitudinally and badly across the fiber, easily through closed books with the leaves and with difficulty across the leaves. Thus, a pile of books or sheets of glass showed polarization like crystals under light. He showed, also, that, on account of the length of these waves, their energy was absorbed differently by different substances; thus (1), water absorbs all the energy, (2) metals absorb all the energy, (3) glass absorbs nearly all, (4) paraffin absorbs hardly any, and (5) hard rubber absorbs hardly any. Thus, they move through hard black rubber and paraffin as light moves through air, glass or water—that is to say, with hardly any resistance—while glass lets very little of them through, and metal and water are impervious to them.

Professor Rubens imbeds his Herz generator in petroleum [paraffin?] for better isolation; and as a handy concentrator of the electric waves uses a round glass bottle filled with petroleum. By placing in turn the glass prism, wire grating, block of wood, pile of books, water, paraffin, and hard rubber in the line of the unseen electric waves pouring from the generator and concentrator toward the wave catcher, he showed on an indicator the easy or retarded passage or the entire interruption of the unseen flow of electric waves.

ELECTRICAL DISTRICTS.

Under date of August 29 Dr. Albert A. Banks sends a diagram showing that within 120 feet of a small house near Columbus, Ga., lightning has struck either house or trees six times during the past fifteen years, the distances being, respectively, 9, 10, 10, 14, 25, and 40 yards, and he asks whether such frequency within such a small area is not unusual, and if there is any significance in this play of the lightning.

We regret that we have not any statistics at hand that will show clearly the average number of strokes per square mile for fifteen years in that part of Georgia, and, therefore, whether this is an unusual case. The testimony of Dr. Banks' neighbors would be more valuable than any theory or opinion of ours. If neighboring houses have not had a similar experience, then there must be some significance in this one; but what that may be, whether it is in the topography or in the underground water, or in the concentration of the paths of thunderstorms, we would not pretend to suggest. We publish this query in the MONTHLY WEATHER REVIEW in hope that some observer near Columbus, Ga., may furnish other cases of similar lightning frequency, so that we may have data enough to elucidate the question.

LIGHTNING AND MAGNETIC ROCKS.

Prof. F. Pockels, of Dresden, communicates to the new annual (Jahrbuch für mineralogie) an argument in favor of the idea that the magnetism observed in almost every stratum of rock, and most of all in the so-called magnetic iron ore, has been produced therein locally by the lightning, or in mountain regions by the perpetual discharge of atmospheric electricity. He says that the magnetic rocks occur in exposed places that protrude prominently above the flat country, and that the north and south poles in these rock masses occur in a perfectly irregular interchangeability, often within very short distances, such as a few centimeters, so that their magnetism can not be due to the inductive action of the earth's magnetic field, as was supposed by Melloni. The latter may have an influence, but it is too feeble for ordinary observation.

In connection with Toepler, Pockels has made a number of experiments on the effect of electrical discharges upon various kinds of stone. Some of these show no magnetism, others become magnetic and rapidly lose that condition, while still others become strongly and permanently magnetic, so that in general he concludes that all forms of stone which show permanent magnetism in natural exposed localities also become magnetic when subjected to the artificial electric spark, so that it is almost certain that the discharges of atmospheric electricity are the cause of the natural magnetism of magnetic stones.

Pockels' conclusion seems to be confirmed by the fact that Professor Barus found no magnetic ore in the deep mines, and no earth currents when he explored them. The almost continuous earth currents in northern countries, such as attend auroras, may have as strong an influence as the lightning of the tropics.

THE STRUCTURE OF HAILSTONES.

In Bauer's new Annual for Mineralogy, published at Stuttgart, Vol. I, page 259, Prof. F. Rinne gives an interesting description of some peculiar hailstones that fell at Hannover on the 9th of January, 1897, as follows:

After many days of cold, extending down to 10° C. without precipitation, there fell at Hannover on January 9, with rising temperature, an abundance of snow, which occasionally disclosed its compact structure by the characteristic rattling noise of falling hail, and especially by blows of the particles of ice on the window panes of the room. The falling of such snow-ice could also be observed after the precipitation

had been partly converted into water in consequence of the rising temperature. The rain water that fell with the particles of ice soon froze to smooth sheets of ice.

The hail in question gradually accumulated to a thick layer. It consisted of an extraordinary large number of small spheres, generally only a few millimeters in diameter, which, by their clear transparency, presented a very beautiful appearance. The little spheres lay at first close to each other on the ground and were rolled about by the wind. Afterwards, by partial thawing and freezing or by freezing the water between them, they adhered to each other and thus produced the impression of transparent fish roe.

The perfect clearness of the dainty drops of ice made it improbable that they would have a radial structure like the sphereolites. Under the microscope many of these, as seen by polarized light, were demonstrably composite, but a great number, on the other hand, and especially the smaller ones, seemed to be simply and uniformly constructed out of one single crystal of ice. We have, therefore, here a remarkable case of individual spherical crystals which, in opposition to the ordinary angular form of the crystal, possess an outer surface of uniform curvature, so that a description in crystalographic nomenclature could only be obtained after a physical determination of the axes. These little spheres under polarized light, viz, between crossed nicol prisms, showed very beautiful polarization phenomena; as they were not hollow, they showed in the center the higher colors, for instance, the green of the second order and diminishing outward in ring-like zones they showed the lower colors in gradual transition. The changing of these polarization colors as the ice spheres melted was especially beautiful.

The extinction of the light as the analyzing prism was turned was smooth and clean, so that, considering the positive double refraction of the ice, the meridian plane of the sphere could easily be determined. Those spheres that lay in appropriate positions upon the stage of the microscope showed in converging polarized light the phenomena characteristic of optical uniaxial crystals, and by testing with a thin plate of gypsum, corresponding with the red of the first order, showed positive double refraction.

Some of the ice particles were bounded by a circular plane surface and a portion of a spherical surface. They were, therefore, certainly only pieces of hailstones, but as it was precisely these that showed the black cross with bright rings when examined with converging polarized light as they lay upon their flat faces, it would seem as though the respective spheres in consequence of their cleavability had been cloven along one of their principal planes by striking other hard bodies; at least this explanation seems to me more probable than that of an original hemimorphic structure in the crystals.

The complex ice spheres showed in polarized light a honeycomb appearance, whence it may be inferred that they were made up of a number of nucleii; the arrangement of the nucleii was irregular. Occasionally in such a little sphere of ice there would be remarked a needle of ice whose location in reference to the sphere seemed not to be arranged according to any law. The needles or bars of ice themselves showed that they were built up of nucleii irregularly arranged. Microscopic round and irregular-shaped bubbles of air collected in groups on the surfaces were quite frequently found, notwithstanding the extreme clearness of the ice formation.

As to the question of the origin of the spherical crystals of ice and the crystalline bars it can not be doubted that we have to do with frozen drops of rain.

I have attempted to make such frozen spheres artificially. If we allow a drop of distilled water that is hanging at the end of a delicate thread, and that forms a nearly spherical ball, to freeze, we obtain a clear sphere of ice. These artificial formations all prove to be complex in their structure.

In their mode of occurrence the above-mentioned spheres of ice remind one in some respects of the chondrule of meteoric stones. (The chondrules are small spherical grains of foreign minerals often with an imperfect radial structure imbedded in meteoric stones.) The history of the origin of these forms is probably also analogous to that of the spheres of ice, in so far as they are frozen drops. The sphere of ice as a unit corresponds especially to the monosomatic chondrule of Tschermak, in which the whole of the little sphere is built up of one round crystal as a unit.

The rest of Professor Rinne's article relates to the structure of meteors rather than to that of hailstones. If we may pass from his study of this particular case of sleet and hail to the larger hailstones that accompany American thunderstorms, one might infer the probability that the latter, upon examination with polarized light, would also be found to have a composite structure. But such matters should not be left to analogy or hypothesis. It is very much to be desired that the numerous physicists of our colleges and schools of science should apply their elaborate outfits of optical apparatus to the minute investigation of the destructive but magnificent hailstones that so frequently occur in connection with our violent thunderstorms.

THE ANCIENT CLIMATE OF ARIZONA.

In May last, Mr. W. T. Blythe, Weather Bureau observer at Phœnix, Ariz., sent to the Central Office some specimens of seeds, cloth, and cord taken from a mummy found among the cliff dwellings of Arizona. In hopes that the nature of the plants to which these three objects belonged might be identified, and that something might result by way of information relative to the climate at the time these plants were living, the specimens were referred to the botanist of the Department of Agriculture. It was ascertained by microscopic examination that "the cloth was made of cotton, but the cord accompanying it was made of a fibre that is not at present recognizable. The seeds appeared to be those of an Aramantus, several species of which are still in use for food by various peoples, including the Indians of the southwestern portion of the United States." An effort was made to raise some plants from these seeds, but they failed to germinate. The general outcome of this study is simply to show that there is no evidence of any material change in the climate of Arizona since the days of the cliff dwellers.

VITALITY OF SEEDS.

Many stories are current in the newspapers of success in sprouting and raising plants from seeds found in Egyptian and Peruvian mummies or burial places, and even still more extravagant tales of plants raised from seeds buried many feet deep in the earth in strata that must have been laid to rest not only in the days of the glacial epoch but in still earlier geological ages, but not a single one of these stories has stood the test of careful investigation; either they were pure fabrications or the plants that actually grew belonged to modern flora and sprang from really fresh seeds; it is proper to say that the cautious botanist puts no faith whatever in these stories, partly because the proper tests have not been applied, but principally because of the results of so many experiments that have been made with great care to test the vitality of ordinary seeds. Every farmer knows that the proportion of seeds that will sprout diminishes year by year the longer the seeds are kept, so that at the end of ten years not one per cent of the ordinary seeds retain their vitality. There are indeed certain plants which in their wild or natural state have a vastly greater vitality than others, but the seeds of food plants cultivated by mankind are among the most delicate. The molecular structure of seeds, and not only seeds, but almost every other substance, whether animal, vegetable, or mineral, undergoes a slow change with time. Wherever sunshine, air, and water can penetrate, there molecular changes are persistently going on; these changes are usually of the nature of a slow oxidation; in the case of animal and vegetable material buried under the soil, far away from sunshine and air, there is a rearrangement of the molecules of carbon, oxygen, and hydrogen, so that they become converted into coal oil and coal oil gas. It is contrary to nature that seeds should retain their vitality under these circumstances; nevertheless the attempt to make them germinate should be made because it does seem as though there might, by chance, be found one that had escaped decomposition. It is equally important to first subject ancient seeds and fabrics, wherever found, to a microscopic examination, since some minute detail of structure may reveal the nature of the plants from which they came.

In general, those Weather Bureau observers and correspondents who happen to be in a position to collect interesting mementoes of the early races that have inhabited this continent would do well to refer their finds directly to the National

Museum at Washington rather than attempt any original investigations of their own, since the proper interpretation of archeological remains is a matter that has been found to require the greatest caution and the most extensive knowledge.

MAURITIUS—METEOROLOGY AND CROPS.

We note that the annual report for 1895 of the Royal Alfred Observatory, on the Island of Mauritius, comes to us with the signature of F. F. Claxton, assistant in charge of the Observatory, he having been appointed first assistant at the close of the year and entering on his duties on February 10, 1896. Since that date Mr. Claxton, who was formerly an assistant at Greenwich Observatory, has been appointed to the position of director, succeeding Meldrum, whose life work has made this Observatory so famous. In this annual report, for 1895, Mr. Claxton gives a table showing the mean annual rainfall for four stations on the Island as compared with the total crop of sugar for the corresponding calendar year, from 1880 to 1895, which we reproduce in the following table, except only that we have rearranged the figures in the order of the annual rainfall:

Rainfall.	Sugar crops.	Year.
Inches.	*Kilograms.*	
42.52	102,376,271	1886
54.35	119,731,492	1880
59.27	127,784,339	1884
59.86	115,299,039	1885
62.84	139,751,810	1893
66.52	117,809,610	1881
68.11	113,795,319	1894
69.40	124,073,140	1887
70.59	130,220,273	1890
72.10	135,564,900	1895
75.67	120,396,858	1883
76.13	68,718,573	1892
78.28	113,813,075	1891
91.71	124,564,951	1889
98.35	116,719,997	1882
106.23	132,172,988	1888

If we divide this series of figures into three groups of five each, omitting the year 1892, when a disastrous hurricane occurred on the 29th of April, we obtain the following averages which give us some idea as to the importance of the

Five year averages.

Rainfall.	Sugar crop.	Date.
55.76	120,988,590	1885.6
69.34	124,292,648	1889.4
90.05	121,533,574	1886.6

annual quantity of rainfall. These averages, as will be seen by the dates of the average crop year, partially eliminate any progressive change in the area devoted to the sugar crop, the style of agriculture, or any other slow change that is going on, and we may infer that the increase of annual rainfall from 55 to 90 inches has had approximately no effect in increasing the total crop. But this must not be misunderstood as implying that rainfall has nothing to do with crop production. The fact is that the sugar cane requires about eighteen months for ripening from the time of planting. A field that is planted in September will be gathered in June of the second following year. The crop then gathered must be compared with the rainfall during those eighteen months, and, more especially, during the middle portion of that interval. It is evident, therefore, that the comparison which we have been able to make, as suggested by Mr. Claxton's figures, is not a fair one, and that the subject must be pursued with more detail, very much as was done by Rawson and Walcott in their studies upon the sugar crop of Barbadoes.

A similar remark must be made with regard to the majority of the compilations of statistics that have been made by those who would elucidate the relation between climates and crops. The rainfall, temperature, humidity, sunshine, and the condition of the soil must be discussed separately for the four divisions of the plant's life. The matter is too complex to be treated by means of crude statistics without an intellectual perception of the laws of plant growth.

As the drought of 1896 in Mauritius was but one item in the destructive drought that prevailed all over the South Pacific, as well as over parts of the Northern Hemisphere, the Editor reserves his discussion of that important subject for the next REVIEW.

PRACTICAL SCIENCE IN GERMANY.

In the MONTHLY WEATHER REVIEW for April, 1895, Vol. XXIII, p. 131, we have dwelt upon the importance to the farmer, and for that matter to the whole country, of the establishment of some Government office—a bureau where the useful efficiency and relative value of machines for agricultural purposes may be thoroughly and officially determined—analogous to the Bureau of Weights and Measures and the offices for testing seeds, investigating fibres, testing the strength of woods, extirpating dangerous diseases, etc.

Somewhat analogous to these latter various bureaus that have from time to time been established in the United States, is the one central institution that has been founded in Germany under the name of the Physical-Technical Institute, which is located at Charlottenburg (formerly a suburb but now included as a part of the city of Berlin), the province of which is to carry out scientific investigations and practical tests that are beyond the reach of the ordinary laboratory, and that are of fundamental or general importance to the whole country.

The following is an abstract of a report prepared by the United States Consul-General at Frankfort, Germany, Frank H. Mason, and published in the number for July, 1897, of the Consular Reports of our State Department:

From the series of expert investigations that have been made during the past two years by English economists and commissions to ascertain the underlying causes of Germany's rapid and ominous advance as a manufacturing nation, one definite conclusion has been convincingly drawn. This is, that, putting aside all questions of protective duties, comparative wages, supply of native materials, etc., Germany, as an industrial nation, enjoys in two respects distinct advantages over Great Britain and every other European country. These are, first, the wide diffusion and high standard of technical and industrial education provided in this country; and second, the liberal and intelligent support that is given by the imperial and various state governments to the development of theoretical science and the higher and more scientific forms of industrial enterprise.

In support of the latter of these propositions, and as an illustration of how far a moderate expenditure of money, under Government authority, can be made to reach in the advancement of scientific investigation and the promotion of engineering and kindred enterprises, the Imperial Physical-Technical Institute at Charlottenburg, Berlin, is cited as the highest existing example of its class, and a model for the study and imitation of other governments which are seeking, as Germany has done since 1856, to prepare and equip their people for the industrial struggles of the future.

The introduction into Congress of a measure like the Hale engineering experiment station bill is a sign that in our own country the need of Government aid in this direction is recognized, and the following brief account of the plan and functions of the great parent institution at Charlottenburg is submitted as a contribution to a movement that has been already initiated.

The Physikalisch-Technische Reichsanstalt, to use its German official designation, was founded in 1887, mainly through the influence of the eminent electrician Werner von Siemens, who gave for the purchase of the site of the institute 500,000 marks ($119,000). The first president of the institution was the renowned physicist, Prof. Hermann L. F. von Helmholtz, who, since his death in 1895, has been succeeded by Prof. Dr. Friedrich Kohlrausch.

The institution comprises two sections, as follows: The physical department, which has for its field the advancement of pure science, or, in the language of Professor Helmholtz, "the prosecution of scientific

investigations which present a practical or theoretic interest, and which involve the employment of methods, apparatus, and prolonged duration of study which are beyond the command of individual investigators or schools of instruction."

The second or mechanico-technical and experimental section is under the chief direction of Prof. Dr. A. Martens, and has for its object "to develop the theoretical results acquired by the physical section, render them useful for practical purposes, to test and certify materials used in manufacture and engineering operations, and to rectify and attest, in accordance with established standards, instruments of measurement and precision."

The institute is governed by a board of eight directors appointed by the Imperial Government, and the working force includes about seventy persons, of whom thirty are expert engineers and other specialists, and the remainder skilled artisans and workmen.

Through the courtesy of Professor Kohlrausch, this report is enabled to give in detail the construction and equipment account of each section of the institute:

I.—PHYSICAL SECTION.

1. Cost of site, gift of Herr von Siemens	$119,000
2. Buildings:	
(a) Observatory	92,106
(b) Engine and machinery house	11,900
(c) Laboratories	23,800
(d) President's residence	23,622
(e) Grading, paving, and planting grounds	2,492
(f) Paving half of adjacent streets	7,205
(g) Building for accumulator batteries	2,023
3. Decorations and furniture for a, b, and c, above	13,804
4. Machinery and instruments	19,590
Total	315,534

II.—TECHNICAL SECTION.

1. Cost of land for site	$88,774
2. Buildings:	
(a) Main building	219,436
(b) Laboratory building	51,884
(c) Engine and machine house	42,840
(d) Residence building for officers	33,320
(e) Subsidiary buildings, outhouses, etc	82,824
(f) Furnishing a, b, and c, above	19,278
3. Machinery and instruments	86,558
Total	624,914

or an aggregate cost for sites, construction, and equipment of both sections of $940,448. The current expense of maintenance, including salaries, wages, materials, repairs, etc., which is partly repaid by fees collected for services rendered, amounts in all to $68,391 per annum.

To describe the work of the *physical section* of the Reichsanstalt would be to give a résumé of the scientific research of Germany during the past six years. * * * As early as 1890 the Imperial Chancellor was able to lay before the Reichstag a memorial written by Dr. Helmholz, summarizing the labors of the previous year, which at that period had been devoted in the physical section to the perfection of thermometers, to barometric observations, and to laying the foundations for the exhaustive study of electrical science which has since been continued with such valuable results.

The second, or *technical section* is divided into sub-departments, according to the nature of the work to be undertaken. One of these provides for the testing of metals, chains, cordage, belts, and woods; another is devoted to the investigation of building material, such as natural and artificial stones, bricks, tiles, slates, timber, glass, lime, cement, mortars, pipes for water, gas, and sewerage; while a third department examines all forms of paper, textile fibers, and fabrics; and a fourth is assigned to the investigation of lubricants and illuminating oils, the chief of that sub-department being recognized as the highest authority in Germany on that subject.

The equipment of these several departments of the technical section includes all the standard instruments used or recognized elsewhere as authoritative, and, besides, a large number of original devices and machines specially invented and constructed by officers of the institute for the particular operations with which they are charged. A description of machines and apparatus would lead into technicalities far beyond the scope of a consular report, and would, moreover, be unintelligible without the aid of illustrations, but a summary of the number in each department will give some idea of the completeness with which the technical section is equipped for its varied and important work:

1. Department for testing metals, under direction of Prof. A. Martens. Here the metal to be tested is put through every conceivable operation—bent, stretched, crushed, punched, planed, chiseled, sheared, welded, cast, alloyed, polished, etched with acids, microscopically examined, chemically analyzed, and photographed in all aspects, many of these operations being performed repeatedly at different temperatures and in reflected or transmitted light. The whole study of a given metal is thus sometimes extended through months and even years, and the equipment for these processes includes forty-one separate machines, ranging in character from a dynamic engine measuring a tensile strain of 500 metric tons to the most delicate microscopic apparatus for studying the behavior of metallic fibers under various forms of physical stress.

2. Department for testing building materials, under direction of Chief Engineer M. Gary. Here every species of material used in building and engineering operations is crushed, stretched, analyzed, split, sawed, cut, polished, and subjected, when both wet and dry, to all temperatures; in short, to all the influences of deterioration, except prolonged time, that are encountered in actual use. For these purposes twenty different machines are provided, and the tests applied to the various forms of cement and mortar occupy in some cases several years, during which a continuous record is kept of every phase and result developed under changing conditions of temperature and humidity.

3. Department for the examination of paper, textile fabrics, yarns, and threads, under direction of Dr. W. Herzberg, chemist. This division includes fifteen machines and sets of apparatus for making every known test of textile fibers, fabrics, and all forms of paper. Its tests and decisions form the standard for the textile industries of Germany, and it has played an important part in the scientific development of that branch of industry that has brought such anxiety to Leeds, Manchester, Bradford, and Roubaix.

4. Department for testing lubricating and illuminating oils, with reference to their lubricity, inflammability, luminosity, and power to protect metals from oxidation. This division is under the direction of Dr. D. Holde, and contains eleven different sets of apparatus for testing oils, besides a complete chemical laboratory for their analysis.

All these departments and the services of their officers and employees are at the service of manufacturers, merchants, engineers, architects, or whoever wishes to obtain complete and exact knowledge concerning the qualities of any material that he may desire to use, purchase, or sell. Pamphlets of instruction are issued, containing minute instructions as to how specimens of materials intended for examination shall be selected, packed, and forwarded to the institute. The fee charged for each examination and certificate depends upon the nature of the inquiry involved and the time and labor required to reach a complete result. For investigations which require a very long time an advance deposit may be required, from which prescribed discounts are deducted under certain circumstances. Results that are of general interest are published in the organ of the institute, the Zeitschrift für Instrumentenkunde, edited by Prof. Dr. St. Lindeck and printed by Julius Springer, at Berlin. Reprints of special reports are published from the Zeitschrift for general sale and distribution.

Another important function of the institute is the testing and sealing of instruments of measurement and precision for private persons, universities, municipalities, and especially for the local testing stations, of which there is one each at Frankfort, Munich, Magdeburg, Mulhausen, and Hamburg. In this, as in all other functions, the institution furnishes the ultimate standards of accuracy for the German Empire. The more important instruments used at the branch testing stations are usually sent to Charlottenburg once a year, where they are tested, adjusted, and stamped with the imperial seal, which is the mark and certificate of standard accuracy.

To illustrate the importance of this service, it may be stated that there were tested and certified at the institute during the ten months from April 1, 1895, to February 1, 1896, 9,780 thermometers, 98 instruments for testing petroleum, 576 alloys of metals, 16 spring manometers, and 20 barometers. Out of all these, 848 instruments were condemned as untrustworthy, 36 were found to have been fatally injured in transit to the institute, 31 were spoiled during the tests, and the remainder were approved and certified.

One of the most interesting features of the whole system is found in the results demonstrated by tests of chains, cables, screws, springs, and other articles of manufacture. As an instance of this, a firm at Neuwied, which manufactures steam hoisting apparatus, submitted in 1895 a lot of 60 iron and steel chains of different sizes and variously formed links. The tests in this case occupied several months, and the report thereon forms a standard treatise on the strength and endurance of chain links of different metals in various forms and sizes under all probable conditions of temperature, friction, and strain.

In view of the important and far-reaching influence of the institute at Charlottenburg upon the scientific and industrial progress of Germany, it should not be too much to hope for that the Government of the United States, representing as it does a people so alert and deeply interested in scientific and industrial progress, may find in the admirable institution herein described a suggestion and inspiration toward a similar enterprise. As competition in manufacture for export becomes more keen and determined, exact and definitely attested standards in materials become more and more important, and the engineers and scientists of our country would gladly welcome and utilize such an institution as one means of keeping abreast of their foremost competitors in Europe.

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Of all public expenditures in Germany, none are more liberal, more willingly paid, or more wisely dispensed than those which are devoted to the cause of public education and the advancement of the sciences. The universities, the technical and the trade schools are on a scale and

of a character not yet attained by those of any other nation, and as such they are the foundation and safeguards of the national prosperity. For every dollar expended on an institution like the Imperial Institute at Charlottenburg, the people receive the rich dividends that come from supremacy in the physical sciences which exalt human industry and constitute the permanent wealth of nations.

As the institute at Charlottenburg represents the needs of the practical and business interests of the whole community, so would the recognition of engineering and mechanics at the agricultural colleges represent the needs of many farmers and progressive agriculturists.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Mariano Bárcena, Director, and Señor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletin Mensual;* an abstract translated into English measures is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW during 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for August, 1897.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Temperature. Min.	Temperature. Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Prevailing direction. Cloud.
	Feet.	*Inch.*	*° F.*	*° F.*	*° F.*	*%*	*Inch.*		
Arteaga (Coahuila)	....	....	90.1	59.2	74.1	......	7.56	....	....
Barousse	5,414	....	83.3	59.4	72.7	......	5.71	....	....
Colima	1,656	....	....	......	80.6	......	......	....	....
Leon	5,934	24.30	86.2	55.4	67.6	68	3.55	ssw.	e.
Linares (New Leon)	1,188	....	101.3	66.2	81.5	......	8.86	se.	....
Magdalena (Sonora)	4,948	....	91.4	77.9	85.5	......	7.95	ne.	ne.
Merida	50	29.93	97.3	69.8	82.2	75	10.52	e.	e.
Mexico (Obs. Cent.)	7,472	23.10	79.7	51.8	63.5	69	6.06	nw.	ne.
Mexico (E. N. de S.)	....	23.04	79.3	47.3	62.1	59	6.07	ne.	....
Monclova (Coahuila)	1,926	....	100.8	71.6	83.7	......	5.48	....	....
Monterey	1,626	28.20	104.0	61.0	82.2	68	5.76	e.	w.
Morelia (Seminario)	6,401	24.00	77.5	77.5	60.1	78	4.19	sse.	e.
Oaxaca	5,164	25.08	89.8	54.0	72.7	76	6.48	nw.	e.
Parras (Coahuila)	3,986	....	90.9	64.8	76.3	......	8.46	....	....
Puebla (Col. Cat.)	2,168	23.37	81.7	48.2	70.3	46	10.19	ne.	ne.
Queretaro	6,070	24.21	84.2	57.8	66.2	65	5.37	e.	....
Saltillo (Col. S. Juan)	5,399	24.82	87.8	60.8	73.0	70	4.06	n.	n.
San Luis Potosi	6,202	24.17	85.5	57.2	68.0	70	3.56	e.	ese.
Sierra Mojada (Coah)	....	....	95.7	54.1	77.4	......	3.74	....	....
Tampico (Hos. Mil.)	38	29.92	91.4	73.8	82.0	79	8.64	se.	se.
Toluca	8,612	21.95	77.4	48.2	59.4	79	5.22	e.	....
Torreon (Coahuila)	3,720	....	100.9	71.8	84.9	......	7.09	....	....
Trejo (H. d. S., Gto.)	6,011	....	73.4	......	......	......	11.05	se.	....
Vaqueria (Coahuila)	....	....	89.6	56.1	72.9	......	11.10	....	....
Zacatecas	8,015	22.55	78.1	49.6	62.4	70	7.28	e.	e.
Zapotlan (Seminario)	5,125	25.08	84.7	59.0	71.1	71	5.95	se.	se.

CLIMATOLOGICAL DATA FOR JAMAICA, W. I.

Through the kindness of Mr. Maxwell Hall, of Montego Bay, Jamaica, the meteorological service of that colony has acceded to the request of the Editor for the prompt communication of an abstract of the very interesting climatological records of that highly important West Indian service. The climatological summary for August, 1897, furnished by Mr. Hall, through his assistant, J. F. Brennan, of the Meteorological Office, is reproduced in the following table.

The stations Kings House, Hope Gardens, and Stony Hill Reformatory are near Kingston, and are not supplied with mercurial barometers. The barometric pressures, as given for these Jamaica stations, are reduced to the standard instrumental temperature (32° F.) and standard gravity (latitude 45° and sea level), and all except Hill Gardens are also reduced to sea level. The thermometers are exposed in Stevenson screens, and their readings have been corrected for instrumental errors. The wind movement is measured by Robinson anemometers, assuming the factor 3. The amount of cloud is given in tenths of the whole sky; the lower clouds are for the most part fracto-stratus; the middle clouds, cumulus; and the upper clouds, cirrus or cirro-stratus.

The observations at 7 a. m. and 3 p. m. at Kingston and Hill Gardens are also communicated in detail by Mr. Hall, but are not published at present, although eventually this may be done, as Hill Gardens is, like Blue Mountain, an interesting mountain station, for comparison with its near neighbors, Castleton Gardens and Kingston. If a mountain summit station can be obtained this also will be published. Many details with regard to the climate of Jamaica will be found in Mr. Hall's contributions to the official handbook published by the Government of that island in 1881.

The important mutual relations between the meteorology of the West Indies and the southern portion of the United States must stimulate the study of these records from Jamaica.

Jamaica, W. I., climatological data, August, 1897.

	Morant Point Lighthouse.	Negril Point Lighthouse.	Kingston.	Kings House.	Castleton Gardens.	Hope Gardens.	Stony Hill Reformatory.	Hill Gardens (Cin. Plant.)
Latitude	17°56′	18° 16′	17° 58′	......	18° 12′	......	......	18°05′
Longitude	76°10′	78° 23′	76° 48′	......	76° 50′	......	......	76°39′
Elevation (feet)	8	33	50	400	580	600	1,400	4,907
Mean barometer 7 a. m.	29.956	29.954	29.965	......	......	......	......	25.405
Mean barometer 3 p. m.	29.918	29.916	29.904	......	......	......	......	25.393
Mean temperature 7 a. m.	......	78.5	76.3	74.3	72.0	73.4	73.6	63.7
Mean temperature 3 p. m.	......	83.8	86.8	88.8	83.4	86.4	79.7	68.4
Mean of maxima	......	88.2	89.5	92.7	87.4	90.3	87.3	72.5
Mean of minima	......	73.3	74.0	68.3	67.5	70.3	68.4	60.0
Highest maximum	......	92	94	97	92	97	91	78
Lowest minimum	......	71	71	65	63	67	65	56
Mean dew-point 7 a. m.	......	73.7	70.4	71.3	69.8	70.2	70.0	58.6
Mean dew-point 3 p. m.	......	74.8	72.9	79.7	77.3	71.5	74.0	63.0
Mean relative humidity 7 a. m.	......	85	83	90	90	90	88	83
Mean relative humidity 3 p. m.	......	75	64	74	79	63	83	81
Monthly rainfall (inches)	5.00	6.71	2.13	5.95	9.09	4.82	6.02	5.38
Average daily wind movement	......	200.5	89.5	......	......	......	......	55.4
Average wind direction 7 a. m.	ne.	ene.	n.	......	......	......	......	......
Average wind direction 3 p. m.	ne.	ene.	se.	......	......	......	......	......
Average hourly velocity 7 a. m.	5.4	6.0	1.0	......	......	......	......	......
Average hourly velocity 3 p. m.	8.0	12.6	7.1	......	......	......	......	......
Average cloudiness (tenths):								
7 a. m. Lower clouds	2.9	0.3	0.8	......	......	......	......	......
7 a. m. Middle clouds	2.2	1.0	0.6	......	......	......	......	......
7 a. m. Upper clouds	1.7	6.0	3.5	......	......	......	......	......
3 p. m. Lower clouds	2.6	3.6	1.5	......	......	......	......	......
3 p. m. Middle clouds	1.8	3.5	1.1	......	......	......	......	......
3 p. m. Upper clouds	1.0	1.9	4.0	......	......	......	......	......

CYCLONE IN NICARAGUA.

A report from Mr. M. J. Clancy, United States Consular Agent at Bluefields (received through Mr. Thomas O'Hara, United States Consul at San Juan Del Norte), states:

On August 15 a cyclone passed over the banana district on the Bluefields River and destroyed 20 per cent of the plants and suckers.

On account of the widespread misuse of the word "cyclone" it may be questioned whether this refers to a tornado or to the smaller West Indian hurricane or to such destructive winds as accompany thunderstorms.

METEOROLOGICAL TABLES.

By A. J. Henry, Chief of Division of Records and Meteorological Data.

Table I gives, for about 130 Weather Bureau stations making two observations daily and for about 20 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation; the altitudes of the instruments, the total depth of snowfall, and the mean wet-bulb temperatures are now given.

Table II gives, for about 2,400 stations occupied by voluntary observers, the extreme maximum and minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (....).

Table III gives, for about 30 Canadian stations, the mean pressure, mean temperature, total precipitation, prevailing wind, total depth of snowfall, and the respective departures from normal values. Reports from Newfoundland and Bermuda are included in this table for convenience of tabulation.

Table IV gives detailed observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, meteorologist to the Government Survey.

Table V gives, for 26 stations, the mean hourly temperatures deduced from thermographs of the pattern described and figured in the Report of the Chief of the Weather Bureau, 1891-92, p. 29.

Table VI gives, for 26 stations, the mean hourly pressures as automatically registered by Richard barographs, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau, 1891-92, pp. 26 and 30.

Table VII gives, for about 130 stations, the arithmetical means of the hourly movements of the wind ending with the respective hours, as registered automatically by the Robinson anemometer, in conjunction with an electrical recording mechanism, described and illustrated in the Report of the Chief of the Weather Bureau, 1891-92, p. 19.

Table VIII gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geographical division one may obtain the average resultant direction for that division.

Table IX gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table X gives, for 56 stations, the percentages of hourly sunshine as derived from the automatic records made by two essentially different types of instruments, designated, respectively, the thermometric recorder and the photographic recorder. The kind of instrument used at each station is indicated in the table by the letter T or P in the column following the name of the station.

Table XI gives a record of rains whose intensity at some period of the storm's continuance equaled or exceeded the following rates:

Duration, minutes..	5	10	15	20	25	30	35	40	45	50	60	80	100	120
Rates pr. hr. (ins.)..	3.00	1.80	1.40	1.20	1.08	1.00	0.94	0.90	0.86	0.84	0.75	0.60	0.54	0.50

In the northern part of the United States, especially in the colder months of the year, rains of the intensities shown in the above table seldom occur. In all cases where no storm of sufficient intensity to entitle it to a place in the full table has occurred, the greatest rainfall of any single storm has been given, also the greatest hourly fall during that storm.

Table XII gives the record of excessive precipitation at all stations from which reports are received.

NOTES EXPLANATORY OF THE CHARTS.

Chart I.—Tracks of centers of high pressure. The roman letters show number and order of centers of high areas. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations. The queries (?) on the tracks show that the centers could not be satisfactorily located. Within each circle is given the highest barometric reading reported near the center. A blank indicates that no reports were available. A wavy line indicates the axis of a ridge of high pressure.

Chart II.—Tracks of centers of low pressure. The roman letters show number and order of centers of low areas. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations. The queries (?) on the tracks show that the centers could not be satisfactorily located. Within each circle is given the lowest barometric reading reported near the center. A blank indicates that no reports were available. A wavy line indicates the axis of a trough or long oval area of low pressure.

Chart III.—Total precipitation. The scale of shades showing the depth of rainfall is given on the chart itself. For isolated stations the rainfall is given in inches and tenths, when appreciable; otherwise, a "trace" is indicated by a capital T, and no rain at all, by 0.0.

Chart IV.—Sea-level isobars, surface isotherms, and resultant winds. The wind directions on this Chart are the computed resultants of observations at 8 a. m. and 8 p, m., daily; the resultant duration is shown by figures attached to each arrow. The temperatures are the means of daily maxima and minima and are not reduced to sea level. The pressures are the means of 8 a. m. and 8 p. m. observations, daily, and correspond to Professor Hazen's system of reduction; the barometer is not reduced to standard gravity, but the necessary reduction for 30 inches of the mercurial barometer is shown by the marginal figures for each degree of latitude.

Chart V.—Hydrographs for seven principal rivers of the United States.

Chart VI.—Diagrams to accompany "The Mechanics of the Kite," by Mr. Decker.

TABLE I.—*Climatological data for Weather Bureau Stations, August, 1897.*

Stations.	Elevation of instruments: Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Pressure, in inches: Mean actual, 8 a. m. and 8 p. m. ÷ 2.	Mean reduced.	Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. and min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Departure from normal.	Days with .01, or more.	Wind: Total movement, miles.	Prevailing direction.	Maximum velocity: Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
New England.							67.0	+ 0.1											3.90	− 0.1											
Eastport	76	69	74	29.87	29.96	− .01	60.5	− 0.3	78	6	68	49	23	53	25	56	54	85	2.79	− 0.7	16	6,077	s.	38	e.	11	10	7	14	6.2	
Portland, Me	103	81	89	29.83	29.93	− .05	63.9	+ 0.9	83	6	73	51	21	58	25	60	57	78	1.41	− 2.3	10	4,846	sw.	31	ne.	24	12	13	6	4.8	
Northfield	872	15	59	29.05	29.97	− .01	61.8	− 0.9	82	*	74	40	23	50	34	58	56	85	2.71	− 1.9	11	5,411	s.	30	sw.	15	7	19	5	5.5	
Boston	125	115	181	29.84	29.97	− .02	69.6	+ 1.1	86	14	77	53	21	62	24	63	60	77	3.95	− 0.5	9	7,003	w.	35	sw.	15	14	8	9	4.8	
Nantucket	14	43	54	29.98	29.99	− .03	67.8	+ 0.4	77	14	73	59	9	62	17	65	63	89	2.66	− 0.5	8	5,959	sw.	30	se.	24	12	8	11	5.5	
Woods Hole	......	51	57	......	......	......	68.6	+ 0.1	79	7	73	56	25	64	18	......	......	......	3.23	− 0.7	6	8,615	s.	37	s.	16	16	7	8	4.0	
Vineyard Haven	......	20	......	......	......	......	70.4	− 0.6	83	14	78	58	18	63	22	......	......	......	5.04	+ 0.9	7	......	sw.	......	......	......	19	6	6	......	
Block Island	27	39	48	29.97	30.00	− .01	68.6	+ 0.5	77	28	73	57	21	64	15	65	64	87	3.41	0.0	6	7,604	sw.	42	ne.	5	9	15	7	5.0	
Narragansett Pier	......	10	......	......	......	......	68.2	− 0.2	80	*	76	50	*	60	25	......	......	......	6.95	+ 3.1	7	......	s.	......	......	......	21	2	8	......	
New Haven	107	118	140	29.87	29.98	− .04	68.8	+ 0.3	83	14	77	51	21	60	24	64	61	78	6.81	+ 1.7	10	5,337	n.	32	sw.	16	15	6	10	4.5	
Mid. Atlan. States.							73.6	+ 0.2											2.89	− 1.7											
Albany	97	84	113	29.88	29.99	.00	69.5	− 0.7	89	4	79	50	23	60	27	64	62	82	4.43	+ 0.4	9	4,697	s.	29	s.	15	13	14	4	4.5	
Binghamton	875	79	90	......	......	......	66.0	......	86	4	77	42	21	55	35	......	......	......	1.37	......	9	3,687	nw.	33	w.	15	11	14	6	5.0	
New York	314	298	326	29.66	29.99	− .03	71.0	− 0.8	84	4	77	60	29	65	18	65	62	76	3.14	− 1.6	13	7,190	s.	49	nw.	22	15	7	9	4.7	
Harrisburg	377	94	102	29.60	30.00	− .03	71.0	− 1.1	87	14	80	55	27	62	27	64	60	71	3.13	− 1.4	10	3,705	w.	36	w.	4	13	11	7	4.5	
Philadelphia	117	168	184	29.87	29.99	− .04	74.4	+ 0.4	90	3	82	62	9	66	23	66	62	70	3.52	− 0.8	9	5,655	nw.	34	sw.	15	11	13	7	5.0	
Atlantic City	52	68	76	29.95	30.00	− .01	72.4	+ 1.6	88	30	78	59	6	66	18	69	67	83	2.07	− 2.7	9	6,354	sw.	32	nw.	11	15	12	4	3.7	
Baltimore	123	68	82	29.86	29.99	− .04	74.3	− 0.2	90	14	83	60	*	66	26	67	63	70	4.71	+ 0.7	8	2,908	nw.	22	sw.	15	11	13	7	4.6	
Washington	112	59	76	29.89	30.00	− .04	73.4	− 0.1	90	14	83	57	8	64	28	67	65	78	3.35	− 0.6	10	3,435	s.	30	nw.	10	14	11	6	3.9	
Cape Henry	......	5	34	......	......	......	77.4	+ 1.0	96	30	84	66	29	70	27	......	......	......	1.53	− 4.0	6	......	se.	......	......	......	12	11	8	......	
Lynchburg	685	83	88	29.30	30.01	− .02	75.2	+ 0.7	94	4	86	57	25	64	30	66	62	69	0.94	− 3.1	5	2,449	nw.	22	ne.	4	13	10	8	4.6	
Norfolk	57	88	93	29.96	30.02	+ .02	77.4	+ 1.6	92	30	85	66	24	70	24	71	70	84	2.08	− 4.0	11	5,084	ne.	38	nw.	30	14	8	9	4.7	
S. Atlantic States.							79.0	+ 0.6											5.22	− 1.6											
Charlotte	773	68	76	29.22	30.01	− .01	75.8	− 0.7	95	30	85	58	7	66	27	68	65	77	3.92	− 1.4	8	3,732	ne.	28	sw.	14	13	12	6	4.7	
Hatteras	11	17	36	30.02	30.03	+ .01	78.2	+ 1.0	86	1	82	68	7	74	11	74	73	84	5.60	− 0.8	10	6,606	sw.	48	nw.	5	12	10	9	4.8	
Kittyhawk	9	12	30	30.00	30.01	.00	77.9	+ 0.5	93	5	83	68	*	73	18	73	72	83	1.33	− 5.5	5	8,063	sw.	33	sw.	30	15	11	5	4.3	
Raleigh	375	93	101	29.64	30.02	− .03	77.3	+ 1.7	95	5	86	61	7	68	23	69	66	74	1.94	− 6.0	8	3,552	sw.	21	nw.	15	11	13	7	5.2	
Wilmington	78	82	90	29.96	30.04	+ .02	78.6	+ 0.8	93	5	86	63	7	71	22	72	70	83	3.50	− 4.0	12	4,673	sw.	30	ne.	15	16	11	4	3.8	
Charleston	48	60	72	30.02	30.07	+ .05	81.2	+ 1.4	94	1	87	71	7	76	19	74	72	78	7.34	− 0.3	15	6,218	sw.	36	se.	2	7	18	6	5.6	
Columbia	......	5	......	......	......	......	78.5	− 0.1	96	5	88	62	7	69	28	......	......	......	5.13	− 1.7	9	......	w.	......	......	......	11	10	10	......	
Augusta	180	89	103	29.84	30.02	+ .02	79.0	− 1.0	97	1	88	64	25	70	26	72	70	80	10.39	+ 5.2	11	3,474	sw.	33	w.	6	14	5	12	5.0	
Savannah	87	63	86	29.96	30.06	+ .03	81.0	+ 1.2	98	1	90	68	*	72	24	74	72	83	6.73	− 1.0	16	4,482	sw.	26	nw.	14	12	6	13	5.6	
Jacksonville	43	69	84	30.01	30.06	+ .04	82.2	+ 0.7	99	2	92	68	20	73	24	74	73	83	6.27	− 0.2	17	4,724	sw.	36	nw.	13	7	14	10	5.8	
Florida Peninsula.							82.4	− 0.1											7.08	+ 0.7											
Jupiter	28	13	30	30.04	30.07	+ .02	81.7	0.0	93	12	88	71	4	76	17	76	75	82	6.85	+ 1.8	13	5,189	se.	32	w.	10	2	22	7	6.1	
Key West	22	42	50	30.05	30.07	+ .06	83.8	− 0.3	91	15	89	71	13	79	19	77	74	73	6.55	+ 1.8	15	5,030	se.	25	nw.	5	8	19	4	5.3	
Tampa	36	60	67	30.03	30.07	+ .06	81.6	+ 0.1	94	15	89	70	*	74	22	75	74	82	7.84	− 1.6	18	3,830	sw.	30	se.	15	12	14	5	4.2	
East Gulf States.							80.0	− 0.1											6.14	+ 0.2											
Atlanta	1,131	92	126	28.89	30.06	+ .02	76.2	− 0.3	96	28	84	62	24	68	29	69	66	78	6.01	+ 1.3	13	5,120	w.	36	e.	30	12	6	13	5.3	
Pensacola	56	78	90	29.98	30.04	+ .03	80.2	− 0.5	97	3	87	70	15	73	25	74	72	79	5.67	− 2.7	16	5,445	sw.	36	ne.	15	10	11	10	5.6	
Mobile	57	88	96	29.99	30.05	+ .04	80.2	− 0.3	101	3	88	69	19	72	29	74	73	86	11.56	+ 4.7	16	4,034	s.	38	se.	3	9	9	13	6.0	
Montgomery	221	100	107	29.79	30.02	+ .01	80.1	+ 0.3	102	3	89	65	25	71	29	72	70	78	6.49	+ 2.4	13	3,773	s.	27	ne.	3	13	7	11	5.4	
Vicksburg	254	65	73	29.74	30.00	− .02	80.2	− 0.5	98	4	89	67	*	72	23	73	70	77	3.24	− 0.3	11	3,541	se.	28	s.	28	12	12	7	4.6	
New Orleans	54	112	120	29.98	30.04	+ .04	82.4	+ 0.9	99	3	89	71	18	76	19	74	71	76	3.12	− 3.0	10	5,169	sw.	25	s.	13	9	9	13	5.7	
Port Eads	......	27	......	......	......	......	81.1	− 0.5	94	3	87	68	25	76	18	......	......	......	6.90	− 0.7	15	......	se.	......	......	......	3	18	10	6.5	
West Gulf States.							81.8	+ 0.7											2.96	− 0.6											
Shreveport	249	77	84	29.74	30.00	.00	83.0	+ 0.8	105	4	94	65	23	72	29	72	68	70	1.86	− 0.3	7	3,629	s.	28	se.	5	17	6	8	3.9	
Fort Smith	481	63	72	29.49	29.98	+ .01	79.2	+ 0.5	103	3	91	58	17	67	32	70	66	71	5.97	+ 2.2	8	2,833	e.	24	e.	5	17	8	6	3.7	
Little Rock	302	71	79	29.70	30.01	+ .01	80.4	+ 0.9	102	4	91	63	21	70	32	69	65	69	4.14	0.0	7	3,456	ne.	31	nw.	10	17	9	5	3.5	
Corpus Christi	20	42	50	29.98	30.00	.00	82.0	+ 0.7	91	5	86	73	26	78	14	77	75	83	3.24	+ 0.2	14	7,766	se.	27	se.	9	10	10	11	5.3	
Galveston	42	85	96	29.99	30.03	+ .04	82.8	0.0	97	4	87	71	20	79	17	76	74	79	4.65	− 0.9	7	6,713	s.	36	n.	4	13	10	8	5.0	
Palestine	510	54	61	29.47	30.00	− .01	82.8	+ 1.6	104	4	94	63	20	72	31	71	67	68	0.48	− 2.2	5	3,716	s.	24	ne.	10	19	8	4	3.7	
San Antonio	704	95	104	29.26	29.98	.00	82.4	+ 0.2	99	10	92	66	20	72	27	71	67	68	0.40	− 3.4	6	5,326	se.	28	n.	11	7	11	13	6.4	
Ohio Val. & Tenn.							74.5	+ 0.2											2.30	− 1.3											
Chattanooga	762	106	112	29.25	30.04	+ .01	76.8	+ 0.3	97	2	87	60	24	67	29	69	66	75	2.10	− 2.1	5	4,105	sw.	31	nw.	22	9	14	8	5.0	
Knoxville	1,004	80	88	29.00	30.03	− .01	74.6	− 0.1	94	4	84	58	24	65	29	68	66	81	5.23	+ 1.2	14	3,570	sw.	50	sw.	30	17	7	7	4.3	
Memphis	399	140	154	29.59	30.00	− .01	80.0	+ 1.5	100	4	89	62	17	71	32	70	66	68	2.64	− 1.0	7	4,602	nw.	43	nw.	30	15	9	7	5.0	
Nashville	545	128	134	29.44	30.01	+ .01	78.4	+ 1.9	100	29	89	58	17	68	32	68	64	67	2.34	− 1.1	10	3,657	nw.	39	s.	30	17	13	1	3.4	
Lexington	989	75	122	28.97	29.99	− .03	73.8	+ 0.9	96	3	84	55	17	64	30	66	62	71	3.21	− 0.4	8	5,602	sw.	46	ne.	22	10	18	3	4.6	
Louisville	525	114	136	29.44	30.00	− .01	76.8	+ 1.3	101	1	88	58	20	66	30	66	61	65	1.35	− 2.2	6	4,871	n.	28	nw.	22	12	11	8	4.5	
Indianapolis	823	154	164	29.15	30.00	− .03	72.3	0.0	98	3	83	50	20	62	32	63	58	65	0.42	− 2.9	4	5,497	nw.	34	sw.	15	11	12	8	4.8	
Cincinnati	628	152	157	29.34	30.00	− .02	73.8	− 0.7	96	3	83	57	31	64	25	65	61	69	1.91	− 1.8	5	4,297	nw.	28	n.	1	21	9	1	3.3	
Columbus	834	87	100	29.13	29.99	− .02	71.1	− 0.4	96	3	82	52	31	61	29	64	60	73	1.95	− 1.3	13	4,291	nw.	39	nw.	4	12	14	5	4.7	
Pittsburg	842	116	123	29.13	30.01	− .01	70.5	− 1.5	91	3	80	50	31	61	29	62	58	71	2.08	− 1.1	13	3,485	w.	32	nw.	4	8	18	5	5.1	
Parkersburg	638	77	84	29.35	30.02	− .03	71.9	− 0.8	96	4	82	54	31	61	31	64	61	74	2.08	− 1.9	9	3,196	se.	22	w.	22	5	22	4	5.5	
Lower Lake Region.							67.3	− 1.1											2.55	− 0.4											
Buffalo	768	178	206	29.17	29.97	− .02	67.0	− 0.2	85	3	74	53	21	60	19	61	56	69	2.12	− 1.0	8	8,593	w.	48	w.	15	11	14	6	5.1	
Oswego	335	76	87	29.59	29.95	− .05	65.6	− 1.4	82	3	73	50	21	58	28	60	56	74	1.70	− 0.9	11	6,019	s.	23	n.	22	13	12	6	4.3	
Rochester	523	81	90	29.41	29.97	− .03	66.6	− 0.9	88	3	76	49	21	57	28	60	56	72	1.72	− 1.3	9	4,784	sw.	24	w.	16	12	15	4	4.4	
Erie	714	92	102	29.24	29.99	− .01	66.6	− 1.9	84	14	74	50	21	59	22	62	59	76	4.70	+ 1.4	9	6,459	s.	28	sw.	16	13	14	4	4.8	
Cleveland	762	190	201	29.19	29.98	− .03	67.1	− 1.4	85	14	74	51	31	60	25	61	57	71	2.63	− 0.5	10	8,476	se.	42	sw.	4	11	11	9	4.7	
Sandusky	629	62	74	29.32	29.99	− .02	69.4	− 1.1	88	15	77	53	21	62	27	61	57	68	2.50	− 0.6	10	5,495	e.	44	n.	4	8	12	11	5.5	
Toledo	674	122	127	29.28	29.99	− .01	68.6	− 0.9	88	29	78	49	20	60	28	61	57	72	1.95	− 0.7	15	5,825	nw.	32	w.	29	11	14	6	4.5	
Detroit	730	160	166	29.22	29.99	− .02	67.8	− 0.9	84	3	76	49	17	60	23	61	57	72	3.10	+ 0.4	12	5,590	sw.	32	sw.	15	14	10	7	4.4	
Upper Lake Region.							64.8	− 0.3											2.41	− 0.5											
Alpena	609	61	65	29.31	29.96	− .03	62.0	− 0.5	83	13	71	42	20	53	35	58	55	79	1.77	− 1.7	11	5,763	nw.	34	nw.	29	13	12	6	4.5	
Grand Haven	628	55	64	29.31	29.97	− .02	65.7	+ 0.2	86	2	74	44	26	57	39	60	56	72	2.01	− 0.7	11	5,867	nw.	34	nw.	9	13	13	5	4.1	
Marquette	734	67	95	29.16	29.93	− .06	62.6	+ 1.1	86	13	71	40	22	55	28	57	54	78	2.83	− 0.1	11	6,821	n.	34	s.	26	11	9	11	5.5	
Port Huron	639	70	108	29.32	29.99	.00	66.2	+ 0.2	84	2	76	45	31	57	31	60	57	78	2.31	− 0.2	15	6,341	s.	35	sw.	15	15	13	3	3.7	
Sault Ste. Marie	624	58	65	29.28	29.94	− .05	61.0	− 0.8	85	2	70	42	31	52	36	56	53	80	2.36	− 0.4	8	5,990	nw.	50	nw.	29	12	8	11	5.2	
Chicago	824	241	274	29.13	29.99	.00	69.0	− 2.0	90	28	75	54	18	63	28	62	58	71	1.70	− 1.2	7	11,209	n.	56	ne.	1	12	13	6	4.5	
Milwaukee	671	106	149	29.28	29.99	− .01	67.6	− 0.5	86	26	76	49	20	60	28	60	56	70	3.00	+ 0.2	11	6,374	nw.	30	sw.	15	7	11	13	6.4	
Greenbay	617	49	57	29.33	29.98	− .03	65.7	− 0.7	85	2	76	44	23	56	28	59	55	72	1.79	− 1.1	11	4,950	sw.	29	nw.	18	12	15	4	5.0	
Duluth	702	95	106	29.22	29.96	.00	63.8	+ 0.5	81	13	71	48	22	57	27	57	54	74	3.91	+ 0.6	13	6,672	nw.	50	nw.	8	8	15	8	5.3	
North Dakota.							65.9	− 0.8											1.19	− 0.7											
Moorhead	935	54	60	28.98	29.97	+ .03	64.8	+ 0.3	86	27	76	39	30	53	38	59	56	77	0.88	− 1.8	4	5,921	nw.	30	nw.	29	13	12	6	3.8	
Bismarck	1,674	16	29	28.26	29.99	+ .07	66.0	− 1.9	93	12	79	43	29	53	41	57	52	66	2.25	+ 0.3	9	6,054	nw.	48	nw.	25	19	10	2	3.2	
Williston	1,875	15	31	28.03	29.96	+ .06	66.8	− 0.7	97	12	82	40	29	52	42	55	46	56	0.45	− 0.7	6	5,519	n.	42	ne.	6	21	8	2	3.1	
Upper Miss. Valley.							70.9	− 0.9											1.74	− 1.3											
Minneapolis	......	99	......	......	......	......	66.8	− 1.7	86	13	76	47	19	58	26	......	......	......	1.94	− 1.2	9	......	n.	......	......	......	6	17	8	......	
St. Paul	837	114	124	29.10	29.98	+ .01	66.3	− 2.2	86	13	76	47	19	57	29	59	55	73	2.18	− 1.1	9	4,772	nw.	29	n.	18	9	13	9	5.5	
La Crosse	......	70	78	......	......	......	66.6	− 1.9	87	1	76	46	30	57	28	......	......	......	3.47	+ 0.2	13	4,042	s.	36	s.	31	12	12	7	5.3	
Davenport	509	71	79	29.34	29.98	− .02	70.8	− 0.5	96	1	81	50	30	60	29	62	56	64	0.68	− 2.9	8	4,431	w.	30	s.	4	13	10	8	4.8	
Des Moines	867	84	88	29.10	30.01	+ .03	70.4	− 1.6	94	28	81	44	20	59	33	62	57	69	1.77	− 1.5	8	4,637	n.	25	nw.	15	22	9	0	2.8	
Dubuque	698	49	56	29.25	29.99	− .01	68.6	− 1.7	92	1	79	46	20	58	29	60	56	67	1.51	− 1.6	7	4,383	nw.	28	nw.	2	17	8	6	3.8	
Keokuk	614	64	78	29.36	30.00	+ .01	72.4	− 0.9	97	2	82	51	20	62	33	63	59	68	0.65	− 2.2	3	4,232	nw.	34	w.	3	19	9	3	2.8	
Cairo	359	87	93	29.61	29.99	.00	77.6	+ 1.1	98	3	87	59	17	68	26	69	66	75	0.89	− 2.0	10	4,104	sw.	33	w.	15	12	11	8	4.9	

TABLE I.—*Climatological data for Weather Bureau Stations, August, 1897*—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Thermometers above ground.	Anemometers above ground.	Pressure, in inches: Mean actual, 8 a. m. and 8 p. m. ÷ 2.	Mean reduced.	Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. and min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Departure from normal.	Days with .01, or more.	Wind: Total movement, miles.	Prevailing direction.	Maximum velocity: Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
Up. Miss. Val.—Con																															
Springfield, Ill.	644	82	92	29.33	30.00	— .02	72.4	— 0.3	98	2	83	51	20	62	33	63	58	66	2.86	+ 0.5	8	5,203	nw.	24	nw.	15	13	16	2	3.9	
Hannibal	534	75	107	......	......	......	72.0	......	95	26	82	51	17	62	35	....	....	..	2.48	+ 0.1	6	4,780	sw.	24	sw.	4	21	7	3	2.6	
St. Louis	567	110	210	29.42	30.01	+ .02	76.8	+ 0.5	101	26	86	59	17	67	35	66	60	61	0.66	— 2.8	7	5,872	n.	30	sw.	28	15	15	1	3.6	
Missouri Valley.							**71.6**	**— 1.3**											**2.34**	**— 1.0**											
Columbia	......	4	84	......	......	......	73.8	— 0.7	102	26	87	48	17	60	38	....	....	....	1.89	— 0.9	8	4,553	n.	24	sw.	26	12	15	4	4.5	
Kansas City	963	78	95	29.02	30.02	+ .03	75.0	+ 0.3	102	1	85	56	20	65	31	65	60	67	3.00	— 0.3	11	4,857	n.	37	s.	4	18	6	7	3.2	
Springfield, Mo.	1,324	164	103	28.64	30.00	+ .01	75.5	+ 0.2	96	*	86	52	17	65	30	65	60	66	1.48	— 2.5	6	5,279	s.	32	sw.	21	10	19	2	3.7	
Topeka	......	81	....	......	......	......	75.2	+ 1.5	105	1	86	54	16	64	34	....	....	....	2.81	— 1.7	10	......	n.	....	......	...	15	13	3	....	
Lincoln	1,199	74	84	28.74	29.98	......	71.7	— 1.9	96	28	83	48	30	60	39	64	61	73	2.69	— 1.5	7	6,406	ne.	48	nw.	17	16	10	5	4.1	
Omaha	1,103	92	97	28.85	29.99	+ .02	71.8	— 0.7	95	28	82	51	16	62	28	63	59	69	1.92	— 1.4	6	5,039	n.	34	nw.	20	15	11	5	4.3	
Sioux City	1,139	96	64	......	......	......	68.2	— 3.4	95	1	80	45	30	56	41	....	....	....	2.51	— 1.3	11	8,054	nw.	39	nw.	26	13	9	9	4.8	
Pierre	1,460	50	61	28.44	29.95	+ .01	70.1	— 1.7	99	25	83	48	16	58	44	61	56	66	2.12	+ 0.5	5	5,799	se.	43	nw.	26	18	9	4	3.2	
Huron	1,306	56	67	28.62	29.99	+ .04	65.8	— 3.2	93	28	79	40	16	53	41	58	55	74	2.69	+ 0.1	8	7,735	se.	35	nw.	29	14	13	4	4.4	
Yankton	1,234	52	58	28.71	29.99	+ .04	68.6	— 3.4	93	31	80	44	16	57	36	61	56	70	1.71	— 1.4	10	5,318	e.	27	nw	26	15	11	5	4.0	
Northern Slope.							**68.2**	**0.0**											**1.27**	**0.0**											
Havre	2,494	15	33	27.38	29.91	.00	68.3	+ 2.0	97	10	84	38	29	52	42	54	42	47	0.17	— 1.2	2	5,639	ne.	38	nw.	25	24	7	0	2.3	
Miles City	2,372	41	49	27.50	29.91	+ .01	71.7	0.0	100	11	87	47	28	57	40	56	45	48	0.32	— 0.7	4	5,029	n.	48	n.	5	16	14	1	3.2	
Helena	4,108	88	93	25.92	29.98	+ .08	68.4	+ 2.2	96	11	82	44	*	55	37	53	40	41	0.52	— 0.1	5	5,048	sw.	42	sw.	31	23	7	1	2.2	
Rapid City	3,251	46	50	26.69	29.95	+ .04	69.2	— 1.0	101	25	81	49	29	57	36	56	44	50	2.15	+ 0.8	7	5,723	nw.	36	nw.	25	17	8	6	4.5	
Cheyenne	6,105	58	60	24.16	29.97	+ .06	64.8	— 0.2	88	25	78	41	21	51	37	52	41	53	1.66	+ 0.1	13	5,503	nw.	27	s.	29	14	13	4	4.5	
Lander	5,372	28	36	24.77	30.01	+ .07	64.9	— 2.2	90	24	81	42	20	49	43	51	39	47	1.04	+ 0.3	7	3,277	sw.	34	w.	25	16	9	6	4.1	
North Platte	2,826	43	52	27.15	30.00	+ .05	70.2	— 0.8	95	25	83	47	21	58	43	61	56	68	3.05	+ 0.6	10	5,451	w.	26	nw.	7	11	17	3	4.5	
Middle Slope.							**74.8**	**+ 0.1**											**2.42**	**— 0.2**											
Denver	5,290	79	151	24.87	30.00	+ .11	69.6	+ 0.1	94	25	83	49	20	57	36	56	45	53	1.44	0.0	7	4,922	s.	39	w.	3	11	16	4	4.5	
Pueblo	4,713	74	81	25.37	29.98	+ .06	71.8	— 0.5	96	31	86	50	20	57	41	57	46	52	2.14	+ 0.1	10	4,516	nw.	40	n.	15	12	19	0	4.0	
Concordia	1,398	42	47	28.54	29.98	.00	74.5	+ 0.8	101	2	87	51	16	62	39	65	61	69	1.88	— 1.0	5	3,780	s.	32	w.	3	15	11	5	4.4	
Dodge City	2,504	44	52	27.44	29.96	+ .03	76.0	+ 0.7	101	1	88	54	22	64	35	64	58	63	3.06	+ 0.2	6	6,253	s.	32	s.	3	19	11	1	3.1	
Wichita	1,351	78	85	28.60	29.98	+ .04	78.2	+ 0.4	102	1	90	56	22	66	36	66	60	64	4.33	+ 0.7	9	4,486	s.	24	s.	3	18	10	3	3.1	
Oklahoma	1,218	54	53	28.74	30.00	+ .05	78.4	— 1.0	98	25	89	56	19	67	33	67	62	66	1.66	— 1.5	7	5,682	s.	28	n.	29	21	8	2	2.7	
Southern Slope.							**77.2**	**+ 0.2**											**2.29**	**— 0.6**											
Abilene	1,749	47	54	28.23	29.99	+ .02	80.8	+ 0.1	101	5	91	63	21	70	31	68	63	64	1.87	— 0.8	6	4,675	se.	35	sw.	6	9	14	8	4.9	
Amarillo	3,691	54	61	26.35	30.01	+ .05	73.6	+ 0.4	92	1	84	58	*	63	28	62	56	65	2.71	— 0.3	12	9,184	s.	36	e.	3	9	13	9	4.9	
Southern Plateau.							**81.4**	**— 0.3**											**1.52**	**+ 0.1**											
El Paso	3,767	10	110	26.22	29.92	+ .03	77.8	— 2.7	95	29	89	59	23	67	30	63	54	53	2.57	+ 0.8	8	5,876	e.	36	ne.	11	12	15	4	4.5	
Santa Fe	6,998	47	50	23.42	29.99	+ .02	66.6	+ 0.1	82	31	78	47	23	55	28	53	43	51	2.33	— 0.3	16	4,321	se.	30	ne.	18	10	20	1	4.4	
Phœnix	1,076	47	57	28.69	29.77	......	89.2	+ 1.2	110	6	102	71	26	76	32	70	60	44	0.61	— 0.4	6	3,146	e.	29	n.	19	18	12	1	2.9	
Yuma	139	16	50	29.62	29.76	— .02	91.9	+ 0.3	112	17	105	69	31	79	38	74	66	49	0.57	+ 0.3	4	4,555	sw.	48	ne.	19	22	9	0	2.5	
Middle Plateau.							**72.9**	**+ 2.2**											**0.25**	**— 0.1**											
Carson City	4,720	82	92	25.30	29.92	......	69.7	+ 2.3	95	23	87	37	31	52	44	52	36	37	0.41	+ 0.3	3	4,577	w.	40	sw.	18	22	8	1	2.5	
Winnemucca	4,340	59	70	25.65	29.86	.00	73.8	+ 4.1	98	23	91	36	31	57	47	52	24	19	0.00	— 0.1	0	......	sw.	...	......	...	20	8	3	2.9	
Salt Lake City	4,344	83	90	25.68	29.91	+ .03	75.2	+ 0.3	95	11	88	52	31	62	33	59	46	40	0.33	— 0.4	4	4,238	se.	32	ne.	25	15	6	10	5.2	
Northern Plateau.							**71.9**	**+ 2.8**											**0.42**	**+ 0.1**											
Baker City	3,470	49	55	26.46	29.92	— .02	70.0	+ 3.7	98	23	86	43	26	54	41	52	35	35	0.90	+ 0.7	5	4,647	s.	25	w.	21	23	5	3	2.5	
Idaho Falls	4,742	10	56	25.30	29.95	+ .05	68.6	+ 1.0	95	24	88	43	26	49	47	54	42	48	T.	— 0.4	0	6,886	s.	38	w.	5	17	8	6	3.5	
Spokane	1,943	99	107	27.94	29.92	+ .01	72.2	+ 3.9	100	20	88	46	26	57	40	56	43	43	0.37	0.0	1	3,196	ne.	26	s.	30	20	8	3	3.5	
Walla Walla	1,018	65	73	28.86	29.90	— .02	76.8	+ 2.4	104	7	91	49	26	62	43	60	48	40	0.42	+ 0.2	4	3,512	s.	36	s.	8	27	3	1	2.2	
N. Pac. Coast Reg.							**63.4**	**+ 2.4**											**0.95**	**— 0.1**											
Fort Canby	179	10	34	29.81	30.00	— .04	59.0	+ 0.1	85	3	64	49	4	54	31	56	54	90	1.04	0.0	6	9,220	n.	52	s.	31	13	6	12	5.3	
Port Angeles	29	47	62	......	......	......	60.0	+ 3.2	81	19	69	42	1	51	30	....	....	....	0.28	— 0.4	3	3,867	nw.	24	w.	31	19	10	2	2.5	
Pysht *h*	......	5	....	......	......	......	60.9	......	83	16	71	43	1	51	33	....	....	....	1.36	+ 0.3	5	......	w.	...	......	...	15	2	6	....	
Seattle	119	100	108	29.86	29.99	......	67.8	......	89	16	78	51	1	58	29	60	55	67	0.24	......	1	3,161	nw.	18	sw.	31	20	8	3	2.8	
Tacoma	213	....	....	......	......	......	66.2	......	90	16	77	48	26	55	32	....	....	....	0.58	......	3	3,602	n.	24	sw.	30	19	7	5	2.7	
Tatoosh Island	86	7	21	29.93	30.03	— .01	56.5	+ 0.5	68	16	61	46	1	52	18	54	52	86	2.66	+ 0.2	5	7,075	s.	50	e.	3	20	3	8	4.0	
Astoria	......	39	60	......	......	......	63.4	+ 1.8	84	*	71	49	1	56	28	....	....	....	0.87	— 0.2	2	......	w.	...	......	...	17	5	9	....	
Portland, Oreg.	153	203	213	29.79	29.95	— .07	71.1	+ 5.1	95	14	82	51	25	60	31	60	53	59	0.26	— 0.3	3	6,919	nw.	35	s.	31	18	11	2	2.9	
Roseburg	521	56	67	29.38	29.93	— .09	70.4	+ 3.6	98	20	84	48	26	56	39	60	53	61	0.19	0.0	2	2,746	nw.	17	ne.	1	20	7	4	2.6	
Mid. Pac. C'st Reg.							**64.7**	**— 0.4**											**0.03**	**0.0**											
Eureka	64	60	69	29.95	30.01	— .01	56.5	+ 0.6	70	30	62	47	29	52	18	54	52	90	0.15	+ 0.1	3	3,590	nw.	24	nw.	11	4	17	10	6.0	
Redbluff	334	54	58	29.54	29.88	+ .03	80.2	— 0.8	109	23	96	56	9	65	38	60	43	32	T.	0.0	0	3,181	se.	20	se.	29	29	1	1	0.8	
Sacramento	71	106	117	......	......	......	73.4	— 0.2	103	19	89	50	4	58	44	....	....	....	0.01	0.0	1	6,569	sw.	24	sw.	10	27	3	1	0.9	
San Francisco	153	161	167	29.81	29.97	+ .03	57.6	— 2.7	70	18	63	49	6	52	19	54	53	90	T.	0.0	0	10,523	w.	36	sw.	19	9	20	2	4.6	
Point Reyes Light	......	12	....	......	......	......	55.9	+ 1.3	71	*	61	48	*	51	22	....	....	....	0.00	— 0.2	0	......	nw.	...	......	...	6	5	20	....	
S. Pac. Coast Reg.							**74.3**	**— 0.2**											**T.**	**0.0**											
Fresno	332	67	70	29.49	29.83	— .01	81.1	— 0.1	108	21	99	54	31	64	41	61	46	35	T.	0.0	0	4,524	nw.	19	w.	18	27	4	0	1.2	
Los Angeles	330	74	82	29.56	29.91	.00	71.8	— 0.7	96	22	83	54	30	61	31	62	59	74	0.00	0.0	0	3,181	w.	15	w.	20	12	19	0	2.8	
San Diego	87	59	70	29.81	29.91	— .01	69.9	+ 0.2	89	20	74	60	2	66	19	64	62	79	T.	— 0.1	0	4,240	nw.	24	se.	20	28	2	1	1.8	
San Luis Obispo	201	10	46	29.75	29.97	......	65.4	......	91	20	79	49	11	52	39	57	53	73	0.00	......	0	3,096	w.	16	nw.	31	23	8	0	3.0	

NOTE.—The data at stations having no departures are not used in computing the district averages. Letters of the alphabet denote number of days missing from the record. * Two or more dates. † Received too late to be considered in departures, etc.

TABLE II.—*Meteorological record of voluntary and other cooperating observers, August, 1897.*

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Alabama.					
Alco†	100	62	78.6	12.19	
Ashville†	101	58	78.8	2.63	
Bermuda†	99	62	78.6	13.45	
Birmingham	101	62	80.0	4.49	
Brewton†	101	61	77.8	9.80	
Bridgeport†	.....	.....	.....	2.60	
Citronelle†	98	69	80.0	13.83	
Clanton†	100	62	78.2	1.05	
Daphne†	100	65	80.1	8.75	
Decatur†	102	54	77.2	1.82	
Demopolis	.....	.....	.....	5.50	
Elba†	98	61	78.9	.....	
Eufaula *a*†	102	63	80.0	5.71	
Florence *a*†	.....	.....	.....	4.14	
Florence *b*†	102	59	78.8	3.82	
Fort Deposit†	101	62	80.3	6.66	
Gadsden	106	59	80.5	4.06	
Goodwater†	105	59	79.5	3.62	
Greensboro†	100	65	79.5	3.70	
Hamilton	105	57	78.5	3.49	
Healing Springs†	102	57	78.0	10.29	
Highland Home†	100	66	78.9	8.01	
Livingston	102	64	79.2	5.57	
Lock No. 4	100	60	77.8	3.45	
Madison Station†	99	55	76.4	2.20	
Maple Grove	96	53	74.2	4.57	
Marion†	101	60	80.4	5.04	
Mount Willing†	102	62	78.8	5.67	
Newbern†	98	65	80.2	4.24	
Newburg	103[e]	55[e]	77.6[e]	6.72	
Newton†	98	62	76.6	8.37	
Oneonta	98	56	75.8	3.41	
Opelika†	104	61	80.2	5.38	
Oxanna†	95	56	76.4	2.91	
Pineapple	104	60	80.4	5.16	
Pushmataha†	104	64	80.1	8.22	
Riverton†	104	60	80.6	5.47	
Rockmills†	92	58	76.2	8.68	
Scottsboro†	102	53	76.6	1.94	
Selma†	104	62	79.7	3.96	
Sturdevant	.....	.....	.....	5.10	
Talladega*[1]	98	62	78.8	3.91	
Tallassee	.....	.....	.....	6.21	
Thomasville	102	64	80.0	6.04	
Tuscaloosa†	100	66	81.4	1.57	
Tuscumbia	102	60	79.7	3.34	
Union†	102	60	80.4	2.44	
Union Springs†	101	63	80.3	5.32	
Uniontown†	99	68	81.4	6.06	
Valleyhead	97	57	76.0	4.78	
Warrior	.....	.....	.....	7.58	
Wetumpka	103	63	80.2	6.73	
Wilsonville†	.....	.....	.....	5.95	
Alaska.					
Killisnoo	68	41	54.6	4.65	
Arizona.					
Antelope Valley	.....	.....	.....	5.13	
Arizona Canal Co. Dam	110	70	89.8	2.14	
Benson*[8]	90	68	81.9	4.10	
Bisbee†	88	60	73.2	2.95	
Buckeye†	110	68	88.8	0.70	
Calabasas	99	63	78.0	3.28	
Casa Grande*[8]	105	77	87.7	0.00	
Cedar Springs	.....	.....	.....	1.46	
Congress	103	62	84.7	1.21	
Dragoon	.....	.....	.....	3.92	
Dragoon Summit*[5]	95	75	82.8	2.15	
Dudleyville	105	60	82.2	2.49	
Farleys Camp†	110	69	88.4	2.35	
Flagstaff†	87	54	71.4	0.17	
Fort Apache	92	49	71.6	2.07	
Fort Defiance	87	46	67.4	1.36	
Fort Grant†	95	56	76.2	1.91	
Fort Huachuca†	92	58	74.2	3.68	
Gilabend *a**[8]	112	78	94.4	2.57	
Gisela	103	61	81.2	3.57	
Glendale	110	69	88.4	0.33	
Holbrook†	93	53	74.1	0.45	
Lochiel*[1]	91	63	73.3	3.05	
Maricopa*[8]	116	82	94.0	0.87	
Mesa†	111	60	90.0	1.64	
Mount Huachuca	96	57	72.8	5.37	
Music Mountain	110	63	84.6	1.32	
Natural Bridge	.....	.....	.....	5.12	
Oracle†	95	62	79.4	2.64	
Oro	.....	.....	.....	1.65	
Oro Blanco	98	59	77.0	4.71	
Pantano*[8]	96	70	81.6	2.05	
Payson	.....	.....	.....	2.48	
Peoria†	107	74	89.7	0.51	
Phœnix	105	68	86.5	1.11	
Pinal Ranch	.....	.....	.....	3.83	
St. Helena Ranch	.....	.....	.....	3.45	
San Carlos†	106	61	84.8	1.20	
San Simon*[8]	98	70	78.3	.....	
Signal†	112	67	89.8	1.11	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
***Arizona*—Cont'd.**					
Snowflake	90	51	71.2	1.84	
Sulphur Spring Valley	.....	.....	.....	1.56	
Texas Hill*[8]	118	80	97.5	0.65	
Tombstone	95	60	75.5	4.41	
Tuba	101	52	77.1	0.25	
Tucson *c*†	101	66[e]	84.0	3.43	
Walnut Grove	.....	.....	.....	1.20	
Walnut Ranch*†[1]	86	62	71.8	2.71	
Whipple Barracks†	96	43	70.8	5.06	
Willcox*[8]	96	63	78.3	0.86	
Williams	90	45	67.2	1.25	
Arkansas.					
Amity	104	57	80.6	1.34	
Arkansas City†	.....	.....	.....	3.32	
Beebranch†[1]	103	55	75.8	2.04	
Blanchard Springs†	103	60	80.6	2.15	
Brinkley	105	56	79.5	2.20	
Camden *a*†	.....	.....	.....	0.29	
Camden *b*†	106	54	79.6	0.25	
Canton*[1]	105	56	78.4	.....	
Conway	108	59	80.9	5.55	
Corning†	104	51	77.9	1.45	
Dallas	101	58	78.8	5.74	
Dardanelle	.....	.....	.....	3.08	
Elon†	104	56	80.4	3.91	
Fayetteville†	100	50	76.4	1.85	
Forrest	103	59	79.9	4.46	
Fulton†	.....	.....	.....	0.39	
Hardy	104	55	78.0	3.10	
Helena *a*†	.....	.....	.....	2.39	
Helena *b*	106	60	81.3	2.29	
Hot Springs *a*	108	59	81.9	3.36	
Hot Springs *b*	.....	.....	.....	3.12	
Hot Springs (near)	.....	.....	.....	2.14	
Jonesboro	.....	.....	.....	8.67	
Keesees Ferry†	109	49	79.3	1.21	
Lacrosse†	105	52	76.1	4.49	
Lonoke*[1]	101	59	79.1	2.75	
Luna Landing*[6]	95	62	80.8	2.10	
Lutherville*[1]	107	63	81.2	.....	
Magnolia	103	61	83.0	0.46	
Malvern†	111	56	80.6	1.33	
Marianna*[1]	102	66	83.1	.....	
Marvell	103	62	81.0	2.40	
Mossville	98	58	80.0	3.67	
Mount Nebo†	93	60	77.1	2.43	
New Gascony*[1]	99	66	81.6	1.74	
Newport *a*†	.....	.....	.....	1.91	
Newport *b*†	105	55	77.2	1.98	
Newport *c*†	108	55	78.6	2.60	
Oregon*[1]	100	54	73.8	.....	
Osceola†	98	61	78.1	2.17	
Ozark†	106	60	81.6	2.42	
Paragould	.....	.....	.....	3.60	
Picayune†	104	60	82.0	3.53	
Pinebluff†	107	60	82.6	3.10	
Pocahontas†	.....	.....	.....	1.26	
Powell*†[1]	107	57	78.1	2.50	
Prescott	109	60	83.8	0.67	
Rison	106	60	81.9	1.42	
Russellville	104	58	79.0	3.50	
Silver Springs†	95	47	72.2	3.93	
Stamps	104	63	83.4	0.87	
Stuttgart†	106	57	81.8	1.07	
Texarkana†	108	60	82.7	1.44	
Warren†	108	60	81.8	4.20	
Washington*†[1]	106	65	83.6	1.11	
Wiggs*[1]	104	60	81.1	2.34	
Winslow	92	54	74.5	2.79	
Witts Springs†	100	52	76.0	3.00	
California.					
Adin	98	39	68.2	T.	
Arlington Heights	108	52	77.7	0.00	
Athlone*[5]	111	63	85.4	0.00	
Azusa	.....	.....	.....	0.07	
Ballast Point L. H	.....	.....	.....	0.00	
Berkeley	75	52	61.1	0.00	
Bishop†	94	44	70.7	0.05	
Boca*[8]	98	30	59.5	0.50	
Bodie†	83	22	56.5	0.47	
Bowmans Dam*†[1]	96	48	72.6	T.	
Caliente*[8]	104	61	81.6	0.00	
Calloway Canal*†[5]	113	64	87.5	0.00	
Campbell	93	44	65.5	0.00	
Cape Mendocino L. H	.....	.....	.....	0.00	
Castle Pinckney*[1]	84[f]	57[f]	65.7[f]	T.	
Cedarville†	97	39	71.9	T.	
Centerville*[1]	98	60	67.6	0.00	
Chico*[8]	112	58	83.5	0.00	
Chino*[8]	104	57	77.1	0.00	
Cisco*[8]	86	42	62.7	0.00	
Claremont†	101	48	69.4	T.	
Corning*[8]	110	62	81.2	0.00	
Coronado	89	65	73.2	T.	
Craftonville	111	50	79.6	0.00	
Crescent City†	69	42	56.9	0.29	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
***California*—Cont'd.**					
Crescent City L. H	.....	.....	.....	0.30	
Delano*[8]	105	63	84.3	0.00	
Delta*[8]	103	48	74.8	0.00	
Descanso*[5]	96	38	70.3	0.04	
Drytown	109	45	75.0	0.00	
Dunnigan*[8]	104	54	79.6	T.	
Durham*[1]	102	50	74.8	0.00	
East Brother L. H	.....	.....	.....	0.00	
Edmanton*[1]	96	41	64.6	0.00	
Elsinore	112	52	81.0	0.29	
Escondido	111	41	75.0	T.	
Fallbrook*[1]	104	55	72.0	T.	
Folsom City *b**[1]	106	60	77.0	0.09	
Fordyce Dam	.....	.....	.....	T.	
Fort Bragg†	.....	.....	.....	0.11	
Fort Ross	75	48	57.8	0.00	
Georgetown	97	49	75.1	0.04	
Goshen*[8]	110	60	83.9	0.00	
Grand Island*[5]	109	52	76.4	T.	
Grass Valley	.....	.....	.....	T.	
Greenville†	102	31	65.0	0.22	
Healdsburg*[1]	93	50	64.4	0.00	
Hollister	98	45	65.5	0.03	
Humboldt L. H	.....	.....	.....	0.00	
Hydesville	74	40	58.2	0.00	
Indio*[8]	115	75	94.5	.....	
Jackson	94	44	73.0	0.12	
Jolon	.....	.....	.....	0.03	
Keeler*[8]	108	70	88.7	0.19	
Keene*[8]	102	52	75.6	0.00	
Kennedy Gold Mine	106	47	75.5	0.15	
Kernville	.....	.....	.....	0.00	
King City*[8]	103	52	67.5	0.07	
Kingsburg*[8]	106	65	83.5	0.00	
Kono Tayee	97	53	75.9	0.00	
Lagrange*[5]	113	54	81.8	T.	
Laporte*†[1]	88	43	62.9	T.	
Lemoore *a**[8]	108	56	82.4	0.00	
Lick Observatory	91	48	71.5	0.00	
Lime Kiln	112	53	82.4	.....	
Lime Point L. H	.....	.....	.....	0.00	
Lodi	104	47	72.0	T.	
Los Gatos *b*	98	44	65.4	0.00	
Lytton Springs	99	51	69.4	0.00	
McMullin*[1]	108	56	82.6	0.00	
Malakoff Mine*[1]	93	51	71.8	0.11	
Mammoth Tank*[8]	118	82	103.3	0.00	
Manzana	104	51	78.8	0.28	
Mare Island L. H	.....	.....	.....	0.01	
Merced*[8]	106	55	81.4	0.00	
Mills College	.....	.....	.....	0.00	
Milton (near)*[1]	108	52	77.1	0.01	
Modesto*[8]	110	55	78.4	0.00	
Mohave*[8]	112	65	87.5	0.00	
Mokelumne Hill*[3]	.....	54	74.2	0.15	
Monterey*[8]	73	52	61.6	0.00	
Morena Dam	100	49	76.4	0.00	
Napa *b*	93	51	67.2	0.00	
Needles	114	73	94.0	0.36	
Newhall*[8]	112	58	78.5	0.00	
North Ontario	98	54	75.8	T.	
North San Juan*[1]	99	55	77.2	0.03	
Oakland *a*	78	51	61.5	T.	
Ogilby*[8]	117	90	100.9	.....	
Oleta*[1]	101	50	72.3	T.	
Orangevale†	108	52	75.2	T.	
Orland*[8]	110	58	83.3	0.00	
Palermo†	110	51	78.4	0.06	
Paso Robles *b*	102	47	71.6	0.02	
Piedras Blancas L. H	.....	.....	.....	0.00	
Pilot Creek	.....	.....	.....	T.	
Pine Crest	99	52	69.5	0.00	
Placerville	98	42	70.0	0.05	
Point Ano Nuevo L. H	.....	.....	.....	0.00	
Point Arena L. H	.....	.....	.....	0.00	
Point Bonita L. H	.....	.....	.....	0.00	
Point Conception L. H	.....	.....	.....	0.00	
Point Fermin L. H	.....	.....	.....	0.00	
Point George L. H	.....	.....	.....	0.05	
Point Hueneme L. H	.....	.....	.....	0.00	
Point Lobos	65	49	56.4	0.02	
Point Loma L. H	.....	.....	.....	0.00	
Point Montara L. H	.....	.....	.....	0.00	
Point Pinos L. H	.....	.....	.....	0.00	
Point Reyes L. H	.....	.....	.....	0.00	
Point Sur L. H	.....	.....	.....	0.00	
Pomona (near)	104	46	74.6	0.00	
Poway*[8]	101	58	68.6	0.00	
Quincy†	96	35	66.2	T.	
Ravenna*[8]	106	60	79.8	1.00	
Redding *b*†	105	54	79.5	0.00	
Represa	100	52	74.6	0.18	
Riovista	104	53	73.3	0.01	
Roe Island L. H	.....	.....	.....	0.00	
Rosewood	108	47	76.1	T.	
Sacramento *a*	102	50	72.6	T.	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
California—Cont'd.					
Salinas*[8]	86	51	65.6	0.00	
Salton*[8]	124	90	107.4	0.00	
San Bernardino†	107	47	77.4	0.00	
San Leandro*[1]	86	57	63.9	0.00	
San Luis L. H.				0.00	
San Mateo*[8]	85	56	66.0	0.00	
San Miguel*[8]	106	54	75.2	0.00	
San Miguel Island	75	52	59.9	0.00	
Santa Barbara *a*	86	60	71.9	0.00	
Santa Barbara L. H.				0.00	
Santa Clara *a*				0.00	
Santa Cruz *b*†	89	45	63.0	T.	
Santa Cruz L. H.				0.00	
Santa Maria	85	53	66.7	0.00	
Santa Monica*[8]	88	67	73.5	0.00	
Santa Rosa*[8]	90	50	65.7	0.00	
Saticoy				0.08	
Shasta				0.00	
Sierra Madre	99	53	74.0	T.	
Sneddens Ranch*[1]	92	18	57.0	0.20	
S. E. Farallone L. H.				0.00	
Stanford University	94	48	65.1	0.00	
Stockton *a*	102	49	71.2	0.01	
Summerdale†	89	45	69.4	0.00	
Susanville†	96	45	72.8	0.08	
Sutter Creek*[5]	102	42[c]	65.6	0.00	
Tehama*[5]	107	62	84.7	0.00	
Templeton*[8]	104	53	71.0	0.00	
Tulare *b*				0.00	
Tulare *c*	112	50	80.3	0.00	
Turlock†	113	46	76.7	T.	
Ukiah†	105	45	70.4	0.00	
Upper Lake	107	46	74.0	0.00	
Upper Mattole*[1]	99	50	65.1	0.00	
Vacaville *a**[1]	108	56	74.7	0.02	
Ventura†	89	42	66.2	0.01	
Volcano Springs*[8]	122	73	96.4	0.03	
Walnut Creek	102	53	72.4	0.00	
West Palmdale*[1]	106	66	86.0	1.57	
Wheatland†	107	51	75.0	0.01	
Williams*[8]	106	57	79.5	0.00	
Wilmington*[5]	101	61	77.6	0.00	
Wire Bridge*[5]	105	54	79.1	0.10	
Yerba Buena L. H.				0.00	
Yreka†	101	44	72.0	0.20	
Yuba City*[5]	99	52	73.4	0.03	
Colorado.					
Alma†	68	27	45.6	3.35	
Antlers†	90	49	70.2	2.07	
Arkins				1.09	
Boulder	87	51	69.0	2.96	
Boxelder				4.31	
Breckenridge†	77	27	53.6	2.27	
Canyon†	96	48	71.8	2.04	
Castlerock	88	42	65.9	8.10	
Cheyenne Wells	96	51	69.7	3.24	
Coilbran				1.09	
Colorado Springs†	89	45	65.4	2.55	
Crook	101	46	70.6	3.71	
Delta	99	45	73.4	0.46	
Dumont†				2.59	
Durango	89	44	66.8	0.93	
Fleming				1.90	
Fort Collins†	94	43	66.8	1.74	
Fort Morgan	98	46	70.1	5.36	
Fox				2.92	
Garnett	82	35	60.1	0.86	
Gleneyrie†	83	46	63.2	1.28	
Goldhill*[1 d]	87	43	62.3	1.97	
Grand Junction†	94	55	75.8	1.05	
Greeley†	90	45	67.6	1.75	
Grover				3.62	
Gulch†	98	38	61.5	1.51	
Gunnison	93	29	61.0	0.90	
Hoehne	91	47	68.8	1.62	
Holly				4.25	
Holyoke				3.35	
Holyoke (near)				2.99	
Hugo (near)	91	44	64.5	6.21	
Husted†	97	41	66.4	1.81	
Lake Moraine†	70	30	52.2	5.26	
Lamar†	102	51	74.4	4.86	
Laporte				1.14	
Las Animas†	101	40	70.8	1.60	
Leadville (near)*†[1]	75	40	52.1	0.91	
Leroy†	96	49	70.0	2.79	
Longs Peak	75	32	53.6	1.29	
Meeker†	90	35	64.4	2.04	
Millbrook†	86	32	60.7	1.16	
Minneapolis†	101	51	72.8	5.19	
Montrose†	89	46	68.3	0.35	
Moraine†	79	37	60.6	2.43	
Pagoda†	92	31	61.8	1.87	
Paonia†				0.26	
Parachute†	92	40	69.1	1.52	
Pinkhamton				1.38	
Colorado—Cont'd.					
Rangely†	95	42	69.8	1.04	
Redcliff				0.75	
Rockyford	99[f]	46[i]	70.2[h]	0.73	
Ruby				1.04	
Saguache†	81	40	62.2	0.80	
San Luis†	91	35	65.2	0.77	
Santa Clara*[1]	89	40	60.0	3.35	
Seibert†				6.64	
Sherwood Ranch	78	33	56.6		
Smoky Hill Mine	87	36	59.2	3.91	
Springfield				4.08	
Stamford*[1]	76	36	50.0	3.13	
Steamboat Springs	89	31	60.5	0.29	
Surface Creek†	91	42	67.8	0.50	
Thon†	95	43	68.4	3.85	
T. S. Ranch†	90	53	71.4	0.94	
Twin Lakes				1.52	
Vilas				4.95	
Walden	86	21	56.8	1.06	
Wallet†				4.16	
Wray†	98	47	72.8	2.27	
Yuma				2.44	
Connecticut.					
Bridgeport	84	50	69.5	4.11	
Canton†	82	41	65.0	6.56	
Colchester	82	45	67.4	8.67	
Falls Village				4.77	
Hartford *b*				5.46	
Middletown	85	48	69.4	7.12	
New London†	80	52	68.8	5.06	
Norwalk	84	48	67.6	3.15	
Southington*[1]	82	47	67.3	6.33	
Storrs	81	46	66.0	5.23	
Voluntown†	82	45	67.0	5.58	
Waterbury	82	47	67.6	3.51	
West Cornwall†	81	48	64.5	5.28	
Windsor	85	47	67.4	8.19	
Delaware.					
Milford	93	58	76.4	2.74	
Millsboro	90	54	74.0	4.90	
Newark	87	54	71.6	2.35	
District of Columbia.					
Distributing Reservoir*[5]	87	62	74.4	2.17	
Receiving Reservoir*[5]	87	61	73.7	4.59	
West Washington	93	54	73.2	3.46	
Florida.					
Amelia†	94	71	82.5	6.75	
Archer†	97	66	81.7	7.30	
Bartow	98	68	82.5	7.67	
Boca Raton†	91	71	81.6	4.47	
Brooksville†	94	70	81.2	9.16	
Carrabelle†	95	67	81.3	5.90	
Clermont†	98	70	83.0	7.44	
De Funiak Springs	99	66	80.5	12.41	
Earnestville†	96	70	82.2	8.08	
Emerson†		69		4.89	
Eustis†	98	70	82.5	7.36	
Federal Point†	96	66	80.4	5.29	
Fort Meade†	94			8.40	
Frostproof	95	69	81.4	6.23	
Gainesville	99	70	82.6	5.99	
Grasmere†	96	70	82.9	3.72	
Haywood	96	68	81.4	9.33	
Huntington	98	69	82.3	6.85	
Kissimmee	97	69	83.9	4.63	
Lake City†	100	72	82.5	6.58	
Lemon City[i]	92	73	83.8	2.20	
Macclenny†	104	68	83.0	12.11	
Merritts Island	94	71	83.0	1.91	
Milton*[1]	98	70	79.7	10.99	
Mullet Key†	93	73	83.4	4.60	
Myers†	92	70	81.0	5.65	
New Smyrna	94	65	79.8	2.17	
Oakhill*[1]	94	74	82.5		
Ocala*†[1]	95	74	80.4	6.90	
Orange City	98	70	85.2	5.30	
Orange Park	97	68	81.5	3.59	
Orlando†	93	69	80.4	4.32	
Oxford*†[1]	95	70	81.6	6.70	
Plant City	95	66	81.1	7.86	
St. Francis†	98	67	81.1	8.61	
St. Francis Barracks	95	69	80.2	5.18	
Sebastian	96	70	83.4	3.11	
Tallahassee†	96	68	79.8	7.29	
Tarpon Springs†	96	67	81.8	7.87	
Wausau	96	65	81.0	9.50	
Georgia.					
Adairsville†	96	59	76.0	5.11	
Alapaha	102	62	80.6	5.72	
Albany†	101	63	81.6	4.22	
Allentown†	99	60	79.4	3.04	
Americus†	102	63	80.8	4.91	
Athens†	97	62	77.2	4.17	
Bainbridge†	98	65	81.4	9.04	
Belleville	105	62	82.6	3.17	
Blakely†	97	65	80.0	8.99	
Georgia—Cont'd.					
Brag	101	62	80.0	5.32	
Camak†	99	63	78.4	4.89	
Canton†				4.05	
Cartersville	95	60	76.6	1.86	
Cedartown	96[i]	50[i]	75.6[i]	2.02	
Clayton†	94	56	74.0	1.63	
Columbus	96[i]	62	80.4[d]	7.90	
Covington	98	63	76.2	5.44	
Crescent	96	69	82.0	4.53	
Dahlonega†	94	54	72.9	1.75	
Diamond	92	50	71.9	3.93	
Eastman†	100	62	79.4	4.28	
Elberton†	96	61	77.6	4.07	
Fleming†	102	66	80.2	9.77	
Fort Gaines	96	64	78.7	9.84	
Franklin	96	62	78.6	6.88	
Gainesville	93	59	75.0	2.48	
Gillsville†	97	60	77.0	2.95	
Greenbush	95	56	74.5	4.06	
Griffin†	98	58	77.0	4.40	
Hephzibah*†[6]	94	70	78.9	4.85	
Jesup	99	65	81.0	6.49	
Lagrange†	99	63	78.8	4.76	
Leverett	102	62	78.6	8.30	
Louisville	99	65[d]	79.4	4.10	
Lumpkin	100	66	79.3	5.39	
Macon† *b*	99	61	79.2	3.37	
Marietta	91	62	75.0	3.86	
Marshallville†	97[e]	66[d]	79.0[e]	4.10	
Milledgeville†	100	61	80.2	4.72	
Millen	102	61	80.4	2.72	
Monticello*[1]	96	65	79.4	5.10	
Morgan†	98	59	78.4	6.40	
Newnan†	106	63	78.6	4.85	
Point Peter	98	61	76.1	6.74	
Poulan†	105	61	80.0	8.87	
Quitman†	98	64	80.6	4.71	
Ramsey	95	56	75.4	4.84	
Rome†	95	60	76.8	2.65	
Talbotton†	97	62	77.0	7.53	
Tallapoosa	94	59	76.1	3.92	
Thomasville†	98	66	81.5	5.18	
Toccoa†	89	58	72.3	2.59	
Union Point	96	58	75.1	7.29	
Washington†	101	60	79.0	6.95	
Waycross	99	58	81.2	2.44	
Waynesboro	98	61	77.4	2.85	
Westpoint	99	63	79.2	6.47	
Idaho.					
American Falls	98	44	71.5	0.68	
Blackfoot†	98	40	[illegible]	0.50	
Bliss	106	45	76.4	0.00	
Boise Barracks†	103	44	75.2	T.	
Burnside†	90	36	68.9	0.11	
Challis	97	40	70.0	0.10	
Chesterfield	92	32	62.8	0.59	
Cœur d'Alene	97	40	69.4		
Downey	96	35	65.9	0.64	
Fort Sherman†	101	40	69.8	0.64	
Gimlet†	94	36	69.0	0.14	
Idaho City	101	37	71.5	T.	
Jansville*[1]	95	35	65.9	0.30	
Kootenai†	100	41	72.7	0.59	
Lake	82	30	58.2	0.00	
Lakeview	91	44	68.0	0.03	
Lewiston†	111	45	78.0	0.52	
Lost River†				0.27	
Martin†	89	35	61.6	1.00	
Marysville	90	36	64.1	0.10	
Minidoka	105	29	65.6	0.00	
Murray†	93	35	64.6	0.60	
Nampa	106	42	75.5	0.12	
Ola†	108	46	72.4	0.00	
Paris	90	35	64.0	0.66	
Payette†	108	40	76.2	0.10	
Pollock†	106	43	73.0	0.27	
Rexburg	93	35	66.0		
St. Maries	93	39	67.8	0.64	
Salubria	105	42	74.6	0.10	
Soldier†	97	32	65.6	0.08	
Swan Valley†	94	30	63.8	0.05	
Warren†	100	32	62.8	0.40	
Yellow Jacket				0.00	
Illinois.					
Albion†	99	53	75.2	1.05	
Alexander†	99	49	74.1	2.20	
Ashton*†[1]	98	54	70.5	0.45	
Atwood *a**†[2]	106	36	65.1	1.09	
Atwood *b*				2.94	
Aurora *a*	97	42	69.4	2.23	
Aurora *b*	96	41	69.1	2.79	
Bloomington†	100	43	72.8	1.50	
Bushnell†	101	42	73.8	0.53	
Cambridge	93	50	70.1	1.16	
Carlinville†	100	52	74.8	1.65	
Carlyle				0.21	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Carrollton	93	52	71.8	0.01	
Charleston	98	47	72.7	0.39	
Chemung *[1]	91	38	65.6	2.00	
Chester	......	......	......	1.36	
Cisne†	97	50	74.0	0.43	
Clearcreek†	102	40	70.6	0.71	
Coatsburg†	93	49	70.7	1.22	
Cobden†	102	51	76.4	2.05	
Cordova	......	......	......	0.68	
Danville	99	41	71.4	0.74	
Decatur†	100	43	72.3	1.40	
Dixon†	98	43	70.2	0.56	
Dwight†	99	39	69.8	1.60	
East Peoria†	97	42[f]	69.3[e]	2.58	
Effingham†	100	50	74.4	0.56	
Evanston *[10]	92	53	71.5	......	
Fort Sheridan†	91	48	67.4	1.52	
Friendgrove *†[4]	100	56	73.0	0.42	
Galva†	97	45	70.6	1.01	
Glenwood *†[1]	96[d]	50[e]	69.7[b]	0.54	
Golconda†	102	51	77.1	1.01	
Grafton†	......	......	......	1.24	
Grayville	99	58	77.0	0.78	
Greenville†	99	52	74.9	1.36	
Griggsville†	97	51	72.8	2.16	
Halliday *[5] *	101	63	79.4	2.61	
Havana†	94	50	72.3	1.22	
Hillsboro†	99	50	73.4	1.16	
Iron [8]	98	55	73.0	1.49	
Joliet†	98	41	71.4	0.55	
Jordans Grove†	100	50	75.3	0.49	
Kankakee *a*†	91	45	68.4	0.36	
Kishwaukee	94	39	67.6	0.57	
Knoxville *a*	95	44	70.9	1.01	
Lagrange†	90	46	67.2	1.57	
Laharpe *[1]	96	48	72.5	1.86	
Lanark *†[1]	93	36	66.4	0.59	
Lexington	95	40	70.1	0.50	
Loami†	......	......	......	2.09	
Louisville†	98	53	74.3	0.39	
McLeansboro†	102	56	75.6	1.70	
Martinsville†	100	49	73.6	0.25	
Martinton†	98	42	70.5	1.28	
Mascoutah *[5]	101	54	76.6	0.14	
Mattoon *[1]	95	49	72.9	0.40	
Minonk†	99	40	70.4	0.92	
Monmouth†	96	40	70.2	0.65	
Morrisonville†	97	47	71.4	1.36	
Mount Carmel†	......	......	......	0.59	
Mount Pulaski	95	50	71.6	1.42	
Mount Vernon	108	52	76.0	0.77	
New Burnside†	104	52	77.6	0.81	
Olney *a*	102	48	74.8	0.40	
Oswego *[1]	94	40	67.0	1.77	
Ottawa†	100	45	71.4	0.74	
Palestine†	99	50	74.2	0.01	
Paris	107	46	74.6	0.53	
Peoria *a*†	......	......	......	0.91	
Peoria *b*†	99	46	71.9	1.02	
Philo†	101	38	70.2	1.20	
Plumhill†	100[e]	54[e]	76.2[e]	0.58	
Rantoul†	97	44	71.2	0.58	
Reynolds	96	45	70.5	0.72	
Riley†	92	45	67.9	1.24	
Robinson†	103	47	74.3	0.41	
Rockford	96	47	71.0	0.90	
Roundgrove†	100	43	71.6	0.89	
St. Charles *†[1]	93	50	67.9	1.67	
St. John *†[1]	106	62	77.9	0.66	
Scales Mound	93	37	67.2	1.53	
Streator†	98	42	70.7	1.07	
Sycamore†	92	40	67.4	1.06	
Tiskilwa *†[3]	93	56	68.9	1.48	
Tuscola†	99	41	71.2	2.10	
Walnut†	100	43	74.0	1.33	
Wheaton *[3]	......	53	66.4	1.11	
Winnebago†	93	43	68.2	1.37	
Zion†	95	40	66.4	1.82	
Indiana.					
Anderson†	97	47	70.7	2.12	
Angola *[1]	98	47	69.0	1.52	
Auburn	94[h]	43[h]	70.7[h]	2.72	
Bloomington†	98	51	73.1	0.59	
Bluffton†	97	45	69.9	4.66	
Bright†	94	53	72.0	0.64	
Butlerville†	96	47	72.4	1.53	
Cambridge City†	96	41	69.0	1.25	
Columbia City *[1]	91	48	68.0	4.45	
Columbus†	95	43	70.1	0.66	
Connersville†	94	43	69.1	3.33	
Delphi†	98	42	70.3	1.62	
Edwardsville *†[1]	96	56	79.7	0.47	
Evansville†	100	54	75.4	0.43	
Farmland†	93	47	68.2	1.89	
Greencastle†	94	50	71.2	1.07	
Hammond†	94	43	67.9	0.29	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Indiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Huntington	96	47	69.0	4.77	
Jasper†	100	53	75.4	0.53	
Jeffersonville	98	56	75.4	1.20	
Knightstown†	97	44	70.7	1.36	
Knox	89	49	69.8	1.80	
Kokomo†	98	47	71.9	2.04	
Lafayette†	96	43	70.9	1.03	
Laporte	94	40	63.9	0.56	
Logansport *b*†	95	45	70.0	0.55	
Madison†	97	54	72.3	1.31	
Marengo†	100	50	74.3	0.97	
Marion†	98	45	70.5	2.85	
Mauzy†	94	45	69.3	2.40	
Mount Vernon†	100	57	78.1	0.57	
Northfield†	96	41	69.6	0.94	
Princeton *[1]	101	54	73.9	1.29	
Richmond	96	42	69.1	1.89	
Rockville†	96	44	71.3	0.44	
Salem	102	45	74.3	0.69	
Scottsburg	99	52	75.8	1.23	
Seymour	98	52	73.1	0.50	
Shelbyville	92	49	71.6	1.47	
South Bend†	92	44	69.1	3.65	
Syracuse†	......	......	......	4.30	
Terre Haute†	99	51	75.1	0.64	
Topeka†	89[f]	41	65.6[e]	3.14	
Valparaiso†	92	44	68.6	2.10	
Vincennes†	102	53	75.8	0.51	
Warsaw†	92	40	68.0	3.03	
Washington†	100	52	74.8	1.18	
Winamac	97	43	69.5	1.30	
Worthington†	100	48	73.5	0.96	
Indian Territory.					
Healdton† [8]	102	59	79.6	4.80	
Kemp†	......	......	......	2.55	
Lehigh†	108	53	81.4	0.43	
Purcell†	104	55	79.3	1.75	
South McAlester†	104	......	......	2.37	
Tahlequah	95	58	76.6	5.45	
Tulsa†	......	......	......	4.24	
Wagoner	106	54	78.8	4.27	
Iowa.					
Adair	......	......	......	2.33	
Afton	99	45	71.3	1.33	
Algona *[1]	86	48	67.3	1.68	
Alta *a*†	88	45	67.4	3.57	
Amana†	95	40	68.6	0.93	
Ames *b*	96	40	69.8	1.48	
Ames (near)	......	......	......	0.47	
Atlantic†	102	36	68.6	2.68	
Atlantic (near)[4]	99	46	70.6	2.16	
Audubon	93	38	67.8	2.98	
Belknap	100	46	70.6	2.70	
Belleplaine	96	38	66.5	1.86	
Bonaparte†	100	43	72.2	1.02	
Britt	89	37	65.0	2.67	
Burlington	98	51	74.0	1.73	
Carroll	96	39	68.5	2.53	
Cedar Rapids†	96	42	68.7	2.62	
Centerville	101	44	71.2	1.62	
Chariton	98	46	71.6	0.69	
Charles City	88	36	65.6	0.76	
Clarinda†	99	49	71.6	2.53	
Clinton	97	42	70.6	0.54	
College Springs	104	48	72.6	2.41	
Corning†	95	43	70.3	2.15	
Council Bluffs	97	45	71.8	2.28	
Cresco†	86	40	65.0	4.36	
Decorah†	88	38	65.8	1.68	
Delaware *[3]	93	42	66.1	3.00	
Denison†	90	43	67.7	2.05	
Dows	91	36	67.0	3.16	
Eldora	98	38	68.8	2.15	
Elkader†	93	38	67.8	2.33	
Fairfield†	96	41	69.6	1.42	
Fayette†	91	35	66.4	1.84	
Fonda	99	48	70.1	1.27	
Forest City	87	41	65.6	1.48	
Fort Madison *†[1]	89	59	73.4	1.18	
Fredericksburg	......	......	......	1.18	
Galva†	94	44	68.0	1.78	
Gardengrove	102	41	69.2	1.87	
Gladbrook	......	......	......	0.69	
Glenwood†	96	43	71.4	2.20	
Grand Meadow *[1]	80	46	63.9	1.04	
Greene	92	37	68.4	1.99	
Greenfield	98	45	70.2	2.14	
Grundy Center	95	39	67.2	1.60	
Guthrie Center	93	39	68.8	2.40	
Hampton	92	43	67.2	2.01	
Hawkeye	......	......	......	0.76	
Hedrick *[1]	94[e]	51[e]	72.1[d]	2.25	
Hopeville†	98	48	71.2	1.62	
Humboldt†	92	38	69.1	1.74	
Independence†	91	37	65.3	1.26	
Indianola†	95	45	70.8	2.34	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Iowa City *a*†	95	43	70.0	1.85	
Iowa City *b*	91	44	68.2	......	
Iowa Falls†	92	37	66.8	3.23	
Keosauqua	97	46	72.6	1.10	
Knoxville	95	45	71.8	1.09	
Lansing	91	40	67.8	1.40	
Larchwood	......	......	......	1.29	
Larrabee†	90	43	66.6	3.18	
Leclaire	......	......	......	0.65	
Lenox *[1]	98	54	70.2	2.26	
Logan†	94	45	68.7	4.98	
Malvern *[1]	100	42	70.2	2.21	
Maple Valley	......	......	......	1.96	
Maquoketa	95	41	68.8	0.93	
Marshall†	95	39	68.8	0.76	
Mason City	86	35	63.2	1.08	
Millman	......	......	......	1.02	
Monticello	94	38	67.5	1.17	
Mooar	98	42	70.0	1.20	
Mountayr†	98	44	70.8	1.72	
Mount Pleasant *[1]	94	56	71.6	0.95	
Mount Vernon *b*	94	43	68.4	0.99	
Neola	99	40	69.4	3.00	
New Hampton	89[b]	40[c]	68.2[c]	2.48	
Newton†	96	43	70.0	1.68	
North McGregor	......	......	......	0.80	
Northwood	86	43	65.0	1.83	
Odebolt	......	......	......	2.95	
Ogden	94	44	69.0	3.64	
Osage *†[3]	......	49	63.5	2.19	
Osceola	98	47	71.4	0.67	
Oskaloosa†	97	39	69.2	1.10	
Ottumwa	102	46	71.0	0.77	
Ovid†	102	44	72.4	1.40	
Plover	92	40	69.0	1.54	
Primghar	90	45	66.8	4.84	
Red Oak	98	40	70.9	2.34	
Reinbeck	......	......	......	1.35	
Rock Rapids	96	38	65.7	2.82	
Rockwell City	94	42	67.3	2.49	
Sac City†	92	42	67.9	1.45	
St. Charles	96	46	70.6	1.13	
Seymour†	101	41	71.8	1.82	
Sibley	91	40	64.0	0.95	
Sidney	97	51	71.4	2.80	
Sigourney	99	43	71.2	2.12	
Spencer	91	38	66.2	1.98	
Spirit Lake†	97	42	67.6	1.22	
Stuart	96	44	69.5	2.57	
Thurman	97	41	70.7	2.42	
Toledo	95	38	68.1	0.75	
Villisca†	95	40	69.4	2.24	
Vinton *[1]	87	45	66.5	1.51	
Washington [f]	95	43	70.5	1.43	
Washta	......	......	......	2.10	
Waterloo	95	41	68.4	1.25	
Waukee	96	40	68.5	1.67	
Waverly	89	42	67.6	1.50	
Webster City	93	44	68.4	4.33	
Westbend *†[1]	87[d]	48	65.1[e]	1.71	
West Branch	94	41	68.8	0.80	
Whitten *[1]	92	44	67.2	1.62	
Wilton Junction†	96	40	69.4	......	
Winterset†	93	42	67.4	2.32	
Kansas.					
Abilene†	109	52	77.0	5.82	
Achilles *[3]	100	49	69.2	5.80	
Altoona *†[3]	103	55	72.4	1.79	
Anthony	......	......	......	4.64	
Assaria *[5]	106	52	77.1	2.17	
Atchison†	102	51	73.4	2.58	
Augusta *[3]	103	51	74.6	2.28	
Baker	103	52	75.2	3.42	
Beloit†	103	50	75.8	0.56	
Burlington†	102	54	77.2	3.62	
Campbell	100	49	74.8	3.07	
Chanute	98[e]	54[c]	75.4[e]	2.99	
Colby†	99	47	72.3	4.84	
Columbus	103	53	77.2	1.36	
Coolidge†	103	51	73.4	4.75	
Cunningham†	110	52	78.5	3.96	
Dresden *[1]	100	59	72.4	3.66	
Elgin *[1]	102	60	77.6	2.39	
Ellinwood†	106	53	76.0	3.11	
Emporia†	101	54	76.8	3.50	
Englewood†	105	49	77.6	2.39	
Eskridge	104	52	75.6	1.99	
Eureka†	......	......	......	3.94	
Eureka Ranch†	106	49	76.0	1.75	
Fall River	101	53	76.9	2.91	
Fort Riley†	105	53	76.8	2.73	
Fort Scott†	101	50	76.8	2.22	
Frankfort	107	49	73.9	4.84	
Garden City†	102	53	74.0	5.80	
Garfield	......	......	......	1.35	
Gibson	106	48	74.9	1.80	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Kansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Girard *[1]	103	62	78.7	2.16	
Goodland	104	45	77.8	4.11	
Gove *†[1]	104	59	76.8	1.87	
Grainfield *[6]	104	60	70.8	3.00	
Grenola	101	51	76.6	3.30	
Halstead	100	50	73.6	2.08	
Horton	103	50	73.0	2.95	
Hutchinson †	103	55	78.2	1.12	
Independence †	103	56	78.8	3.52	
Lakin †	108	50[d]	77.1	6.30	
Lawrence	101	54	74.3	2.69	
Lebo †	103	55	76.4	2.86	
Linn	......	......	......	3.58	
Macksville	106	49	74.9	2.18	
McPherson	106	53	73.8	2.57	
Manhattan *b*	107	51	77.2	0.87	
Manhattan *c*	103	48	75.2	1.03	
Marion †	107	......	......	3.90	
Meade †	108	57	80.8	2.90	
Medicine Lodge †	109	52	78.6	6.05	
Minneapolis †	109	49	76.7	1.93	
Morantown †	100	54	76.9	2.56	
Morland	100	47	73.0	2.72	
Mounthope *[1]	104	60	78.2	2.54	
Ness City	107	53	77.8	2.18	
Newton	106	53	78.0	3.35	
Norton	97	46	71.6	3.12	
Norwich †	106	54	79.6	2.20	
Oberlin †	......	......	......	4.75	
Olathe †	103	52	75.8	2.85	
Osage City †	104	50	75.6	2.83	
Osborne	......	......	......	1.00	
Oswego	104	53	79.4	1.44	
Ottawa	103	52	74.3	4.01	
Phillipsburg	100	46	72.8	1.81	
Pleasant Dale	108	52	75.5	4.11	
Pratt	104	52	81.6	6.30	
Rome *†[1]	102	58	76.8	3.84	
Russell	104	......	......	1.84	
Salina †	109	50	78.0	2.00	
Scott City	103	51	74.2	3.24	
Sedan †	103	52	77.4	3.43	
Seneca	100	46	72.4	2.87	
Sharon Springs *[1]	110	57	78.0	3.45	
Toronto	104	50	77.0	3.01	
Ulysses †	104	49	73.7	4.13	
Viroqua †	104	53	75.4	4.41	
Wallace *[1]	104	52	75.4	4.83	
Wamego *[1]	104	52	74.6	2.30	
Wellington *[1]	97	56	77.4	2.99	
Winona *[1]	104	55	76.2	5.25	
Yates Center	102	51	76.1	3.37	
Kentucky.					
Alpha †	98	53	76.8	2.64	
Ashland	101	55	74.0	3.10	
Bardstown †	100	54	75.8	3.52	
Blandville †	100	53	76.2	2.29	
Bowling Green *a* *[1]	100	53	74.2	2.51	
Bowling Green *b* †	102	58	78.2	2.30	
Burnside †	......	......	......	5.45	
Caddo †	97	50	73.2	2.43	
Canton *†[1]	102	59	77.8	1.02	
Carlisle	97	50	72.2	3.00	
Carrollton †	98	52	74.1	1.79	
Catlettsburg †	......	......	......	3.79	
Earlington	98	57	76.5	0.40	
Edmonton †	94	54	73.8	2.40	
Ensor	101	55	76.8	0.88	
Eubank †	94	49	72.6	2.46	
Falmouth †	......	......	......	3.41	
Fords Ferry †	102	54	78.0	0.43	
Frankfort †	97	53	73.0	1.16	
Georgetown	94	55	74.4	......	
Greensburg †	104	52	77.8	4.00	
Henderson †	100	59	77.8	0.61	
Hopkinsville †	102	56	78.4	1.21	
Irvington	96[j]	54	75.3[e]	1.61	
Leitchfield †	102	52	75.4	3.70	
Loretto	98	50	75.4	1.63	
Lyndon	95	53	72.9	1.17	
Marrowbone †	96	53	74.2	2.87	
Middlesboro †	94	51	73.0	2.66	
Mount Herman	95	54	76.0	1.28	
Mount Sterling †	95	52	73.2	4.63	
Owensboro †	99	52	75.4	0.78	
Owenton †	98	56	75.6	2.21	
Paducah *a* †	......	......	......	1.22	
Paducah *b* †	104	58	80.2	1.23	
Pleasure Ridge Park †	101	51	74.8	1.83	
Princeton	103	55	78.1	2.56	
Richmond †	98	54	74.5	4.39	
Russellville †	101	56	77.8	5.01	
St. John †	99	52	74.1	1.33	
Sandyhook	......	......	......	1.77	
Scott	98	55	74.3	2.30	
Sergent	......	......	......	3.40	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Kentucky—Cont'd.	°	°	°	*Ins.*	*Ins.*
Shelby City *[6]	100	51	73.6	1.59	
Shelbyville †	98	51	74.3	2.69	
Southfork[5]	......	......	71.7	1.82	
Vanceburg	97	53	72.1	4.10	
Williamsburg †	98	55	75.2	3.00	
Louisiana.					
Abbeville	98	70	80.5	9.55	
Alexandria †	104	64	81.5	5.08	
Amite †	101	63	81.3	10.62	
Bastrop †	103	63	82.1	1.42	
Baton Rouge †	98	65	81.2	10.70	
Calhoun	103	63	82.6	2.47	
Cheneyville †	101	63	80.2	4.15	
Clinton †	99	63	80.5	9.48	
Como	99	61	79.6	0.86	
Covington	100	64	80.5	8.55	
Donaldsonville †	100	69	81.5	7.90	
Emilie †	97	66	79.4	8.66	
Farmerville[e]	103	63	81.4	0.67	
Franklin †	100	70	81.4	7.18	
Grand Coteau	97	67	79.4	9.82	
Hammond	102	64	81.0	13.46	
Jeanerette	101	66	80.9	6.34	
Lafayette †	99	60	80.8	9.60	
Lake Charles †	102	68	82.2	8.59	
Lake Providence	99	65	82.7	6.63	
Lawrence	99	70	82.8	3.86	
Liberty Hill	109	60	82.6	2.97	
Mansfield †	105	58	80.5	0.63	
Melville	98	66	81.2	10.70	
Minden	104	62	82.6	2.74	
Monroe †	106	64	82.9	2.30	
Montgomery	105	65	81.4	7.58	
New Iberia	97	70	80.7	8.30	
Oakridge †	104	60	81.8	1.73	
Oberlin	96	60	76.6	3.10	
Opelousas †	104	64	81.2	10.56	
Oxford †	102	61	80.0	2.44	
Paincourtville †	100	65	79.9	3.69	
Plain Dealing †	104	63	82.5	2.36	
Rayne	101	68	82.3	9.97	
Robeline	105	60	79.9	2.75	
Ruston	103	67	82.5	2.17	
Schriever	100	60	81.2	4.98	
Shellbeach	98	70	81.9	8.34	
Southern University †	95	67	79.2	3.90	
Sugar Ex. Station †	99	70	81.7	3.56	
Sugartown †	102	64	82.4	1.88	
Venice †	94	68	80.4	10.67	
Wallace	96	69	80.4	8.50	
Whitehall	101	65	81.4	7.90	
White Sulphur Springs	105	66	82.6	8.94	
Maine.					
Bar Harbor	86	45	65.6	8.22	
Belfast *[6]	78	54	65.0	3.92	
Cornish *[1]	84	51	65.0	4.84	
Fairfield	82	46	65.8	2.82	
Fort Fairfield	79	33	62.4	4.26	
Gardiner	88	48	68.2	2.66	
Kineo †	80	43	63.2	3.11	
Lewiston	88	50	68.4	3.79	
Mayfield	83	43	62.8	4.07	
North Bridgton	85	46	65.7	3.35	
Orono	85	41	63.8	5.09	
Maryland.					
Annapolis	88	63	76.1	4.39	
Bachmans Valley	90	51	69.4	5.62	
Boettcherville[2]	......	......	66.5	2.60	
Charlotte Hall †	90	57	73.8	3.04	
Cherryfields †[2]	......	......	74.8	3.95	
Chestertown †	85	59	71.8	4.95	
Collegepark	90	51	71.0	3.02	
Cumberland *b*	89	55	72.2	2.26	
Darlington †[e]	86	54	71.6	2.57	
Deerpark	88	39	62.7	5.33	
Easton †	89	53	73.4	3.18	
Fallston *[1]	85	59	70.4	4.67	
Flintstone	94	44	68.3	2.31	
Frederick	90	54	72.0	2.25	
Grantsville	93	43	65.4	2.02	
Greatfalls *[5]	86	59	73.5	1.82	
Greenspring Furnace	92	51	70.6	3.91	
Hagerstown †	93	52	72.3	2.53	
Jewell †	......	59	......	4.71	
Johns Hopkins Hospital	90	58	72.0	4.60	
Laurel	91	55	72.9	2.33	
McDonogh *[1]	86	63	72.5	......	
Mardela Springs †	90	58	74.8	2.89	
Mount St. Marys Coll. †	88	50	70.5	3.23	
New Market[4]	90	52	71.9	4.11	
Pocomoke City	95	60	77.3	3.00	
Port Deposit	90	58	73.4	1.48	
Princess Anne	87	55	71.1	2.76	
Sharpsburg	90	54	70.3	5.19	
Smithsburg	84	53	69.6	2.78	
Solomons †	91	63	76.6	3.19	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Maryland—Cont'd.	°	°	°	*Ins.*	*Ins.*
Sunnyside	87	39	63.6	5.10	
Taneytown †	92	48	72.9	4.46	
Van Bibber	86	55	71.8	4.52	
Western Port	95	47	70.4	3.38	
Woodstock	88	54	70.6	4.57	
Massachusetts.					
Amherst	85	42	66.2	4.32	
Bluehill (summit)	83	49	66.8	5.74	
Cambridge *a*	86	47	69.0	4.47	
Chestnut Hill	87	47	69.2	4.68	
Concord †	86	44	67.4	3.45	
Fallriver	83	54	69.4	5.87	
Framingham	85	45	68.1	2.95	
Groton	85	45	65.8	4.52	
Hyannis *†[1]	82	52	68.8	4.37	
Lawrence	90	54	71.0	3.29	
Middleboro	84	40	66.9	2.63	
Monson	86	45	67.2	3.23	
New Bedford *a*	82	54	68.8	8.57	
Springfield Armory	85	41	65.6	4.09	
Taunton *b*	84	45	66.6	4.06	
Wakefield	87[f]	47[f]	68.4[f]	3.61[d]	
Westboro †	87	44	69.2	2.66	
Worcester *b*	84	49	67.7	3.21	
Michigan.					
Adrian	93	40	67.4	3.22	
Allegan	90	38	64.2	3.00	
Alma	89	39	65.1	1.24	
Ann Arbor	92	44	67.0	2.88	
Arbela	88	43	65.2	3.22	
Badaxe	86	44	65.6	2.59	
Baldwin	91	30	62.2	1.13	
Ball Mountain	82	44	65.5	1.59	
Baraga	88	37	62.0	1.59	
Battlecreek	93	42	67.8	1.99	
Bay City *b*	87	44	65.4	1.16	
Benton Harbor	90	43	67.3	1.44	
Berlin	86	40	63.8	1.75	
Berrien Springs	92	41	67.7	2.62	
Big Rapids	88	34	63.6	0.31	
Birmingham	94	44	66.2	3.62	
Boon	86	33[c]	60.9[c]	1.61	
Calumet	82	42	60.5	1.94	
Carsonville	86	38	64.6	1.30	
Charlevoix	85	45	64.0	1.87	
Cheboygan	85	37	64.2	3.01	
Clinton	96	40	67.5	2.83	
Coldwater	91	38	66.8	1.74	
East Tawas	84	42	64.1	2.63	
Eloise	97	45	66.1	3.95	
Escanaba †	84	39	64.1	2.24	
Ewen	85	36	61.4	......	
Fairview	89	44	65.7	2.29	
Fitchburg	90	37	64.4	2.73	
Flint	87	38	63.7	3.08	
Gladwin	86	37	62.8	0.68	
Grand Rapids *b*	94	44	67.6	1.06	
Grape	93[f]	43[f]	68.6[f]	3.39	
Grayling	92	34	61.6	2.35	
Hanover	90	39	66.2	4.84	
Harrison	89	39	62.7	2.60	
Harrisville	85	42	63.5	2.99	
Hart	89	41	65.7	0.92	
Hastings	94	37	66.1	1.29	
Hayes	86	45	66.6	1.53	
Highland Station	......	......	......	2.64	
Hillsdale	90	38	66.0	0.74	
Holland *[10]	87	54	68.5	......	
Howell	89	40	66.8	3.14	
Humboldt	84	28	57.4	1.60	
Ionia	92[c]	37[f]	67.0[f]	0.32	
Iron River	82[i]	30[h]	57.9[h]	1.15	
Ivan	91	37	63.4	1.84	
Jackson	93	43	67.6	2.33	
Jeddo	84	44	65.0	1.44	
Kalamazoo	90	44	68.0	2.20	
Lake City	90	31	61.5	1.32	
Lansing	88	42	65.0	1.90	
Lapeer	89	39	64.8	2.24	
Lathrop	84	30	60.1	1.01	
Ludington	87	40	66.6	0.42	
Luzerne	85	35	60.8	3.48	
Mackinaw City	81	37	62.1	2.38	
Madison	93	44	67.4	3.17	
Mancelona	88	35	61.2	2.74	
Manistee	83	40	64.4	1.36	
Manistique	79	36	61.3	2.46	
Mayville	92	42	65.4	2.12	
Middle Island *[10]	81	53	64.8	......	
Midland[3]	......	41	63.7	0.71	
Mottville	95	39	68.4	1.25	
Mount Clemens	88	42	66.2	2.78	
Mount Pleasant *b*	89	40	65.4	1.49	
Muskegon	86	44	66.1	1.28	
Newberry	85	30	59.3	1.23	
North Manitou Island *[10]	84	50	64.3	......	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Temperature. (Fahrenheit.) Minimum.	Temperature. (Fahrenheit.) Mean.	Precipitation. Rain and melted snow.	Precipitation. Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
North Marshall	90	38	64.9	2.33	
Northport	82	44	64.0	2.64	
Old Mission	85	41	63.4	3.53	
Olivet	88	45	65.9	2.11	
Omer	83[c]	35[c]	61.4[c]	0.96	
Ovid	88	40	65.5	1.03	
Owosso	90	40	67.0	2.04	
Parkville	......	......	......	1.25	
Petoskey	......	31	......	2.60	
Plymouth	91	44	66.1	3.14	
Point Au Barques *[10]	88	48	66.5	......	
Pontiac	91	44	67.0	2.71	
Port Austin	85[f]	42[c]	62.6[c]	0.88	
Reed City	90[d]	34[d]	62.6[d]	1.10	
Rockland	85	38	60.8	2.10	
Rogers City	81	36	59.8	2.63	
Saginaw	90	44	66.4	1.92	
St. Ignace	82	41	62.3	2.62	
St. Johns	91	42	66.9	0.83	
Sandbeach *a*	84	35	63.2	2.56	
Sidnaw	89	35	61.2	......	
Somerset	89[c]	42[c]	65.5[c]	3.25	
South Haven	86	44[d]	65.6[d]	1.98	
Stanton	88	42	65.1	1.96	
Sturgeon Point *[10]	81	50	66.4	......	
Thomaston	87	34	59.9	1.60	
Thornville	86	42	66.2	1.47	
Thunder Bay Island *[10]	86	46	64.4	......	
Traverse City	92	42	67.2	2.27	
Valley Center	87	32	63.2	1.60	
Vandalia	95	43	69.0	1.47	
Wasepi	91	42	67.3	1.93	
Waverly	93	34	64.8	1.44	
West Harrisville	81	40	62.3	3.03	
Wetmore	83	32	58.9	1.47	
White Cloud	89	36	65.2	1.14	
Ypsilanti	87	43	66.2	2.64	
Minnesota.					
Ada†	85	41	64.6	1.53	
Alexandria†	90	41	64.1	2.12	
Beardsley	86	34	63.6	2.01	
Bermidji	90	......	......	1.40	
Bird Island	85	43	64.4	1.93	
Blooming Prairie†	88	41	64.9	4.00	
Bonniwell	85	42	65.4	1.68	
Caledonia†	89	43	65.2	3.48	
Camden	89	42	64.0	2.99	
Campbell	87	34	63.2	1.79	
Collegeville	85	47	65.5	2.71	
Crookston†	83	40	63.6	1.15	
Detroit City	85	40[c]	63.2[c]	0.95	
Faribault	84	41	66.6	3.96	
Farmington†	89	39	64.6	3.44	
Fergus Falls†	86	42	64.2	1.97	
Glencoe	86	36	64.8	3.06	
Glenwood†	92	40	64.2	5.55	
Grand Meadow†	88	42	65.0	2.15	
Granite Falls	88	40	64.8	1.30	
Koochicking	84	35	60.3	2.41	
Lake City	86	44	66.0	4.20	
Lakeside†	85	40	64.8	4.10	
Lake Winnibigoshish[1]	79*	41	62.3	2.32	
Lambert†	83	36	61.8	1.18	
Lawrence	90	40	64.8	0.90	
Leech Lake[1]	84*	38	62.1	2.18	
Lesueur *[1]	88	50	65.9	5.30	
Luverne†	90	42	64.3	2.17	
Lynd	92	42	64.8	1.94	
Mapleplain	87	43	67.1	2.48	
Maplewood *[1]	84	55	65.9	......	
Mazeppa[1]	88*	38	65.8	2.70	
Milaca	98[c]	36[c]	67.8[c]	1.37	
Milan†	91	35	64.5	0.30	
Minneapolis *b*[1]	86*	39	63.6	2.05	
Minnesota City†[1]	86	40	66.5	3.46	
Montevideo†	89	48	65.3	1.12	
Morris	88	42	65.8	1.11	
Mount Iron	86	33	58.6	4.38	
New London	95	40	66.0	1.02	
New Richland *[1c]	86	50	65.6	......	
New Ulm†	86	41	65.4	2.15	
Park Rapids†	83	34	61.1	1.12	
Pine River[1]	85*	35	64.3	1.20	
Pokegama Falls[1]	82*	35	60.3	3.37	
Redwing	......	......	......	3.29	
Reeds	......	......	......	5.50	
Rolling Green	86	44	65.8	0.90	
St. Charles†	86	42	64.6	3.05	
St. Cloud	88	44	64.8	......	
St. Olaf	86	42	63.8	2.44	
St. Peter	83	47	65.8	4.53	
Sandy Lake Dam[1]	82*	41	61.5	1.65	
Shakopee[6]	84*	44	67.1	2.06	
Spring Park	......	......	......	2.17	
Tower†	88	26	58.5	4.65	
Two Harbors†	82	40	62.5	4.11	

Stations.	Temperature. (Fahrenheit.) Maximum.	Temperature. (Fahrenheit.) Minimum.	Temperature. (Fahrenheit.) Mean.	Precipitation. Rain and melted snow.	Precipitation. Total depth of snow.
Minnesota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Wabasha *[1]	90	47	65.1	4.14	
Willmar†	87	40	64.4	5.25	
Winnebago City	92	41	66.6	4.88	
Worthington	87	45	64.0	1.81	
Mississippi.					
Aberdeen†	104	58	80.1	3.05	
Agricultural College	100	65	81.1	3.59	
Austin†	98	59	79.3	4.16	
Batesville†	102	55	78.4	1.82	
Bay St. Louis	95	71	81.6	6.14	
Biloxi†	98	66	81.2	6.08	
Booneville†	104	60	80.0	3.47	
Briers†	98	66	79.8	7.69	
Brookhaven†	105	61	80.4	6.89	
Canton†	102	64	81.9	5.24	
Columbus *a*†	......	......	......	6.43	
Columbus *b*†	106	64	82.5	6.20	
Corinth	105	57	80.2	0.69	
Crystal Springs†	104	62	81.0	4.32	
Edwards	104	64	82.8	5.73	
Fayette†	98	57	81.0	2.00	
Fulton†	102	60	80.2	2.07	
Greenville *a*	96	64	79.4	2.72	
Greenville *b*†	100	63	81.2	2.24	
Greenwood	97	67	80.7	......	
Hattiesburg†	99	69	82.6	7.33	
Hazlehurst†	103	63	81.4	5.43	
Holly Springs†	102	58	79.9	5.53	
Itta Bena	103	57	79.0	2.56	
Jackson†	102	61	80.6	5.40	
Lake†	100	62	78.8	5.25	
Leakesville†	103	65	80.6	15.57	
Logtown†	100	67	81.1	5.23	
Louisville†	103	59	79.4	4.19	
Macon†	103	64	81.8	1.50	
Magnolia†	103	61	80.3	15.60	
Mayersville	98	61	79.1	3.95	
Meridian†	103	62	79.9	10.36	
Mosspoint	100	70	86.2	6.50	
Natchez†	101	65	81.2	6.85	
Okolona†	106	64	81.9	3.25	
Palo Alto	103	63	81.6	2.13	
Pontotoc	103	61	80.4	3.98	
Port Gibson†	102	61	80.8	5.00	
Rosedale	98	59	79.6[c]	1.57	
Stonington *[1]	100	68	81.4	......	
Tupelo†	......	......	......	2.95	
Water Valley *†[1]	103	58	78.3	3.38	
Waynesboro *b*†	101	66	81.8	10.88	
Windham†	108	59	78.2	9.27	
Woodville†	99	65	80.0	9.39	
Yazoo City†	104	60	82.2	3.52	
Missouri.					
Akron	......	......	......	2.15	
Arthur *[3]	......	59	73.6	1.64	
Birchtree	97	47	73.0	5.67	
Bolckow†	......	......	......	3.21	
Boonville†	......	......	......	3.25	
Brunswick	96	52	71.6	1.79	
Carrollton†	99	53	73.6	3.14	
Conception	95	51	71.2	3.13	
Cowgill *[5]	100	54	73.8	3.59	
Darksville†	100	50	73.2	1.20	
Downing	......	......	......	1.32	
East Lynne	......	......	......	1.21	
Edgehill *[5]	98	54	73.4	3.74	
Eightmile *[1]	100	54	72.9	1.43	
Eldon *[1]	101[c]	49	72.8	3.76	
Elmira	103	45	73.2	3.78	
Emma *[3]	108	56	73.4	3.80	
Fairport	......	......	......	4.50	
Farmersville	......	......	......	3.00	
Fayette	99	53	75.0	2.21	
Fulton	......	......	......	2.14	
Gallatin *[1]	98	48	73.4	2.88	
Glasgow	100	50	73.8	2.53	
Gordonville *[3]	......	58	71.6	1.36	
Gorin	......	......	......	1.60	
Halfway	101	49	76.4	1.16	
Harrisonville†	104	51	74.8	1.62	
Hastain	103	48	76.1	0.90	
Hermann†	......	......	......	1.69	
Houston	103	48	73.2	4.26	
Houstonia	......	......	......	7.87	
Humansville	105	49	77.0	1.25	
Irena	......	......	......	2.43	
Ironton†	104	44	73.6	2.52	
Jefferson City†	104	53	75.2	1.05	
Kidder	98	48	71.2	3.68	
Lamar†	101	52	77.0	0.64	
Lamonte	......	......	......	2.21	
Lebanon	99	54	75.7	3.15	
Lexington†	103	57	76.0	3.97	
Liberty	102	50	73.6	4.46	
McCune†	......	......	......	1.48	
Mansfield	......	......	......	4.50	

Stations.	Temperature. (Fahrenheit.) Maximum.	Temperature. (Fahrenheit.) Minimum.	Temperature. (Fahrenheit.) Mean.	Precipitation. Rain and melted snow.	Precipitation. Total depth of snow.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Marblehill	103	47	74.6	0.98	
Marshall†	101	47	73.6	2.27	
Maryville	101	46	71.4	3.25	
Mexico†	98	50	73.8	1.74	
Mineralspring	96	48	74.1	1.01	
Montreal *[1]	99	58	73.3	1.96	
Mount Vernon	103	50	78.4	3.36	
Neosho	96	49	74.3	0.74	
Nevada *[5]	100	57	76.3	2.69	
New Haven *[1]	97	58	77.4	0.87	
New Madrid	107	54	79.4	3.40	
New Palestine *†[1]	99	61	76.2	3.22	
Oakfield	101	53	76.1	0.56	
Oakmound	......	......	......	2.87	
Oakridge *[4]	......	60	74.6	2.18	
Olden†	97	49	74.1	2.36	
Oregon *a*	102	54	73.2	5.13	
Oregon *b*	102	52	72.4	5.13	
Osceola†	......	......	......	0.71	
Oto	......	......	......	2.10	
Palmyra *[5]	96	56	73.6	1.50	
Phillipsburg *†[1]	103	57	74.1	2.80	
Platte River *[3]	100	56	69.8	3.90	
Poplar Bluff	103[b]	49[d]	77.5[d]	2.29	
Potosi	94	41	68.8	1.09	
Princeton	105	45	73.7	1.74	
Rhineland	97	52	74.1	1.21	
Rolla	......	......	......	2.02	
St. Charles	100	54	75.6	1.54	
St. James *[3]	......	56	71.9	......	
St. Joseph†	......	......	......	4.05	
St. Louis	102	50	73.2	1.45	
Sarcoxie *[3]	100	48	72.4	1.29	
Sedalia	99	49	74.8	1.84	
Seymour *[1]	98	54	72.6	3.00	
Sikeston	101	53	75.8	2.95	
Stellada†	104	48	74.2	1.15	
Sublett	101	41	71.7	1.08	
Trenton	99	48	71.7	2.26	
Unionville†	100	46	73.0	1.92	
Vichy	104	54	76.0	3.15	
Virgil City	......	......	......	1.98	
Warrenton	100	52	74.6	2.14	
Wheatland	......	......	......	1.18	
Willow Springs	98	47	72.6	5.50	
Zeitonia *[1]	102	55	75.4	0.99	
Montana.					
Boulder †[g]	91	41	65.9	......	
Bozeman†	92	44	68.2	0.27	
Bozeman Exper. Stat'n.	87	41	65.0	0.26	
Butte†	91	36	65.8	0.30	
Chinook†	104	36	73.3	0.71	
Ekalaka	100	35	67.6	0.36	
Fort Benton	95	39	69.7	0.00	
Fort Custer†	103	44	72.2	0.12	
Fort Keogh†	100	42	69.4	0.24	
Fort Logan†	94	33	63.6	T.	
Fort Missoula	95	37	68.4	0.83	
Glasgow	104	34	68.4	0.12	
Glendive†	103	48	72.6	0.30	
Glenwood	94	37	67.4	0.19	
Greatfalls†	102	45	70.2	0.07	
Hogan†	92	38	67.2	0.10	
Kalispell	96	35	67.2	0.11	
Kipp†	98	31	63.1	0.39	
Livingston†	95	35	68.4	T.	
Manhattan†	92	31	65.2	0.12	
Martinsdale†	93	35	66.4	0.68	
Marysville†	90	40	64.7	1.58	
Poplar	100	36	68.5	0.58	
St Ignatius Mission	103	39	68.4	0.33	
St. Pauls†	95	35	69.3	0.02	
Troy	99	34	66.9	0.14	
Utica†	100	38	67.8	0.30	
Virginia City†	90	39	66.4	0.52	
Wibaux†	......	......	......	T.	
Yale†	95	35	66.0	0.58	
Nebraska.					
Agee *[1]	98	50	70.2	0.43	
Albion	96	44	68.7	2.30	
Alliance *[1]	94	56	71.0	2.15	
Ansley†	99	41	67.9	4.55	
Arapaho *[1]	102	52	73.6	1.35	
Arborville *[1]	96	46	72.3	1.60	
Arcadia	104	44	72.5	2.11	
Ashland *a*†	98	45	72.4	1.44	
Ashland *b* *[1]	98	50	73.3	1.56	
Ashton	99	45	72.1	2.35	
Auburn *†[1]	102	45	74.5	3.74	
Aurora *[1]	98	58	77.4	2.94	
Bassett	98	41	67.6	1.24	
Beatrice†	100	46	71.6	5.12	
Beaver City†	102	47	73.9	1.50	
Benedict	......	......	......	2.11	
Benkelman	......	......	......	3.78	
Bluehill *[1]	99	58	73.4	2.52	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Brokenbow				1.36	
Burchard				4.42	
Burwell				1.41	
Callaway †	97	42	68.9	1.78	
Camp Clarke	102	42	70.1	3.88	
Central City				2.07	
Chester *[1]	98	54	73.5	2.50	
Columbus †	100	46	69.6	3.11	
Cornlea				3.46	
Creighton †	98	42	69.8	1.69	
Crete	97	48	71.3	3.50	
Culbertson				2.95	
Curtis *a*	101	49	72.2	3.26	
David City *†[1]	94	54	67.4	3.30	
Dawson	104	45	73.5	5.96	
Divide				2.74	
Dunning *[1]	99	55	75.2	1.91	
Eden				6.11	
Edgar *[1]	100	53	73.8	4.17	
Elba				2.38	
Ericson *†[1]	99	56	73.1	2.61	
Ewing †				1.90	
Fairbury †	102	46	73.0	3.37	
Fairmont †	103	45	72.0	2.48	
Fort Robinson	101	45	68.8	T.	
Franklin	106	41	73.4	3.53	
Fremont †	97	44	69.7	2.27	
Geneva †	100	44	71.4	3.04	
Genoa	96	45	70.6	2.93	
Gering †	99	41	70.2	1.96	
Gothenburg	97	47	71.7	3.10	
Grand Island *a* *[1]	105	55	77.8	2.17	
Grand Island *b*	97	46	71.2	2.40	
Greeley *[1]	100	57	74.3	2.60	
Hartington †	99	42	67.8	1.60	
Harvard *[1]	96	54	71.8	2.56	
Hastings *[1]	96	53	71.0	2.91	
Hayes Center				2.32	
Hay Springs	99	47	67.7	3.10	
Hebron †	98	45	72.0	2.63	
Hickman				3.13	
Holdrege *b* *[1]	100	50	72.6	0.95	
Imperial *a* †	107	48	73.5	6.03	
Indianola (near) *[1]	97	54	72.2	0.82	
Kearney *[5]	96	56	76.1	1.60	
Kennedy	99	42	69.2	3.61	
Kimball †	95	45	69.7	1.66	
Kirkwood *[1]	100	55	70.5	1.41	
Lexington †	96	43	70.4	1.57	
Lincoln *b* †	95	49	71.9	2.71	
Lincoln *d*	97	46	71.7	2.33	
Lodgepole †	98	42	68.5	3.61	
Loup *a*				6.70	
Loup *b* *[1]	96	44	69.3	7.75	
Lynch *†[1]	95	46	69.4	1.31	
Lyons				2.51	
McCook *[1]	100	58	73.7	1.81	
McCool				1.61	
Madison *[1]	95	38	67.5	3.26	
Madrid *[5]	108	45	72.3	2.19	
Marquette				1.72	
Minden *a* *[1]	98	43	71.4	2.27	
Minden *b*				2.18	
Monroe				2.58	
Nebraska City *c*	100	37	71.8	2.36	
Nemaha *[1]	108	46	72.6	2.76	
Nesbit	100	45	70.4	1.99	
Norfolk *a* †	94	44	68.8	2.67	
Norfolk *b*	99	45	70.6	2.67	
Norman	95	45	71.1	4.55	
North Loup †	98	43	69.4	2.54	
Oakdale †	95	41	67.6	3.38	
Odell *[5]	96	58	74.0	2.83	
O'Neill †	95	41	67.2	2.26	
Ord				3.33	
Osceola				2.29	
Ough †				5.78	
Palmer *b*				3.49	
Ravenna *a*	98	44	70.6	6.54	
Ravenna *b* *[1]	100	58	72.2	6.09	
Redcloud *a*				1.06	
Republican *[1]	98	54	72.6	6.41	
Rulo *[1]	100	58	74.6	5.23	
St. Libory	96	50	71.6	3.04	
St. Paul	96	50	73.2	3.23	
Salem *[1]	104	52	75.3	4.10	
Santee Agency †	101	45	71.4	1.28	
Sargent				3.03	
Schuyler				4.29	
Seneca *[1]	94	44	68.0	1.80	
Seward *[1]	94	53	71.6	2.05	
Springfield *[1]	93	49	71.2	2.16	
Springview	99	46	70.0	2.14	
Stanton *[1]	94	38	68.7	1.97	
Stockham				2.00	
Strang *[1]	98	56	75.4	4.60	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Stratton				2.97	
Stromsburg				2.90	
Superior *[5]	98	58	74.7	1.39	
Sutton				2.85	
Syracuse				1.65	
Tecumseh *b* †	102	45	71.6	4.84	
Tekamah	98	42	69.8	3.06	
Thedford *[1]	98	48	69.7	2.90	
Turlington †	101	47	69.4	2.60	
Valentine †	100	43	69.3	2.09	
Valparaiso				1.60	
Wakefield	96	42	68.0	1.59	
Weeping Water *[1]	97	42	68.0	2.95	
Westpoint †	96	39	69.3	1.86	
Whitman				0.57	
Wilber *[1]	94	52	72.7	3.77	
Willard				1.39	
Wilsonville *[1]	100	56	73.8	4.63	
Wisner *[5]	96[c]	50[c]	69.8[c]	2.18	
Woodlawn				2.12	
York *[1]	100	44	74.3	1.68	
Nevada.					
Austin	90	54[c]	71.8[c]	0.38	
Battle Mountain *[1]	99	40	73.2	0.00	
Beowawe *[1]	100	43	76.2	0.00	
Candelaria	98	47	75.6	0.18	
Carlin *[1]	102	40	72.2	0.00	
Carson City	95	34	67.8	0.34	
Cloverdale *[1]	95	62	74.6	0.20	
Clover Valley				0.50	
Cranes Ranch				0.20	
Darrough Ranch				0.59	
Downeyville	106	50	81.8	0.10	
Elko *[5]	100	38	66.9	0.15	
Ely	92	33	65.2	0.55	
Fenelon *[1]	98	53	72.8	1.75	
Golconda *[1]	99	55	72.8	0.00	
Halleck *[1]	105	50	69.4	0.27	
Hamilton	104	31	68.6	0.20	
Hawthorne *a* *[8]	95	61	79.9	0.10	
Hawthorne *b*	97	50	75.8	0.05	
Hot Springs *[1]	104	57	83.9	T.	
Humboldt *[1]	98	50	74.0	0.00	
Keysers Springs				0.40	
Lewers Ranch	98	37	68.6	0.43	
Los Vegas	97	50	77.7	0.76	
Lovelock *[1]	105	58	81.6	0.00	
McGill [c]	95	34	65.9	0.04	
Midas	89	49	72.0	0.55	
Mill City *[1]	108	50	76.4	0.00	
Monitor Mill	91	40	66.8	0.62	
Osceola	94	53	74.2	1.42	
Palisade *[8]	99	60	77.2	T.	
Palmetto	94	41	68.0	1.47	
Reno *[8]	105	45	76.2		
Reno State University	94	45	69.6	0.07	
Ruby Valley				0.26	
St. Thomas	110	58	87.8	0.55	
San Antonio	98	42	76.2	0.60	
Silver Peak	102	42	75.9	T.	
Sodaville	103	52	80.6	0.36	
Tecoma *[1]	102	57	74.5	T.	
Toano *[1]	94	56	72.4	0.98	
Tybo	96	48	73.4	0.55	
Verdi *[1]	104	40	65.9	0.20	
Wadsworth *[1]	104	68	83.5	T.	
Wells	98	35	69.7	0.57	
New Hampshire.					
Concord	85	37	64.4	3.58	
Durham	86	45	66.4	2.97	
Grafton †	85[c]	37[c]	63.6[c]	2.59	
Hanover	80	44	64.4	1.70	
Keene	84	39	64.8	4.01	
Lancaster	84	40	63.0	3.40	
Nashua	87	45	67.7	3.98	
Newton	85	45	66.0	3.33	
North Conway	87	39	64.8	2.30	
Peterboro	85	39	65.4	2.77	
Plymouth	89	40	65.6	2.53	
Sanbornton †	81	42	64.0	2.79	
Stratford	91	41	65.9	2.88	
West Milan	85	35	61.0	2.44	
New Jersey.					
Asbury Park	97	58	71.2	2.94	
Barnegat	90	59	73.6	3.43	
Bayonne	90	54	72.8	5.83	
Beachhaven	89	61	73.4	3.27	
Belvidere	88	49	70.3	4.44	
Beverly †	91	54	72.7	4.00	
Billingsport *[1]	89	60	72.6	2.25	
Blairstown	89	49	70.9	2.65	
Boonton	89	48	70.3	7.30	
Bridgeton	90	60	74.8	5.03	
Camden	87	57	71.4	4.58	
Cape May	85	60	72.8	2.85	
Cape May C. H. †	89	55	72.2	2.37	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Charlotteburg	86	41	66.4	7.97	
Chester	83	50	68.1	6.39	
Clayton	88	56	72.2	5.06	
College Farm †	88	52	71.7	3.81	
Deckertown	85	46	67.8	3.98	
Dover	88	46	69.6	8.23	
Egg Harbor City	88	51	71.4	4.75	
Elizabeth †	91	53	71.8	6.15	
Englewood	88	48	69.4	2.90	
Franklin Furnace	85	48	66.8	5.72	
Freehold	87	54	70.4	4.11	
Friesburg				6.50	
Gillette	88	49	66.6	5.50	
Hammonton				5.19	
Hanover	85	49	69.0	4.65	
Hightstown	88	53	71.3	4.47	
Imlaystown	90	54	73.0	3.14	
Junction				2.42	
Lambertville	92	53	73.3	2.71	
Moorestown	89	53	71.8	3.12	
Newark *b* †	88	55	72.2	8.69	
New Brunswick *a*	90	53	73.0	4.27	
New Brunswick *b*	85	51	69.0	4.19	
Newton	84	49	68.1		
Ocean City	89	56	72.8	2.45	
Oceanic	85	56	69.9	3.94	
Paterson	86	53	70.6	7.59	
Perth Amboy	90	53	71.5	5.45	
Plainfield	87	53	70.7	5.49	
Port Norris	86	51	72.7	2.27	
Rancocas				3.05	
Readington *[6]	88	62	75.1		
Rivervale	88	42	66.6	4.32	
Roseland	88	47	69.4	6.06	
Sergeantsville	86	52	70.0	2.63	
Somerville	90	52	72.0	3.96	
Staffordville				3.43	
Toms River	90	49	70.2	6.21	
Trenton	90	60	75.2	2.85	
Vineland	90	54	72.4	5.62	
Woodbine	87	50	71.6	2.25	
New Mexico.					
Albert	98	55	74.6	2.81	
Albuquerque †	91	51	74.4	1.31	
Alma	93	49	72.4	2.16	
Angus V. V. Ranch	82	44	63.1	3.56	
Aztec †	92	48	71.8	0.49	
Bernalillo †	95	55	75.3	0.47	
Bluewater †	95	44	69.0	0.93	
Buckmans	86	26	58.2	3.54	
Clayton	93	48	72.8	1.79	
Deming *[3]	101	67	77.5	1.41	
East Lasvegas †	84	44	65.7	3.29	
Eddy	100	57	76.8	5.04	
Engle †	94	54	74.1	3.38	
Espanola †	91	46	71.3	1.01	
Fort Bayard	89	50	69.4	5.31	
Fort Union	83	46	66.0	4.33	
Fort Wingate	93	50	70.6	1.03	
Gallinas Spring †	95	42	71.3	1.09	
Gila	99	53	77.3	2.42	
Hillsboro †	93	55	74.0	3.22	
Las Cruces †	98	50	74.3	1.16	
Lordsburg *[6]	90	65	77.3	1.25	
Lower Penasco	88	53	69.4	3.15	
Monero †	90	38	63.4	2.04	
Olio	98	47	74.3	T.	
Puerto de Luna †	97	56	75.4	3.09	
Raton †	91	38	64.6	0.36	
Rincon †	96	51	76.6	2.61	
Roswell †	98	53	75.2	2.54	
San Marcial †	97	54	76.4	0.38	
Shattucks Ranch	92	47	67.4	3.77	
Socorro	94	53	74.6	1.02	
Springer †	96[f]	40[f]	68.6[f]	1.73	
Valley Ranch [k]	94	43	67.7	3.99	
White Oaks †	88	48	68.8	2.28	
Winsors Ranch	80	29	56.4	3.57	
New York.					
Adams				3.54	
Addison	87	41	64.6	2.05	
Akron				1.73	
Angelica †	85	38	62.6	1.77	
Appleton	85	46	65.1	2.14	
Arcade	84	41	62.6	3.62	
Atlanta				2.20	
Avon	90	42	65.7	0.90	
Baldwinsville	86	50	67.6	2.63	
Bedford	83	46	67.5	4.26	
Big Sandy *[10]	84	48	67.0		
Binghamton †	88	43	66.0	1.84	
Bolivar	85	36	61.2	3.26	
Bouckville	85	43	63.8	1.98	
Boyds Corners				5.63	
Brentwood	92	45	68.4	2.10	
Brooklyn	86	56	71.9	4.07	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New York—Cont'd.	°	°	°	Ins.	Ins.
Canajoharie	88	49	68.8	2.98	
Canton	87	41	64.8	3.33	
Carmel	86	47	67.9	4.90	
Catskill	86	50	68.8	4.13	
Cedar Hill	......	......	......	5.14	
Charlotte *[10]	80	48	62.4	......	
Chenango Forks	......	......	......	2.30	
Cherry Creek	......	......	......	4.06	
Cooperstown †	82	44	63.8	6.60	
Cortland	85	41	64.2	2.07	
De Kalb Junction	......	......	......	2.46	
Dryden	87	42	64.8	2.22	
Eagle Mills	......	......	......	3.63	
Elmira	89	43	67.6	3.70	
Fleming	86	50	67.0	2.52	
Fort Niagara †	88	50	68.0	1.94	
Franklinville	86	38	62.6	2.63	
Fulton	......	......	......	3.02	
Garrattsville	83	40	63.2	4.31	
Glens Falls	85	42	65.5	5.42	
Gloversville	87	40	64.2	3.46	
Haskinsville	......	......	......	1.89	
Honeymead Brook	85	46	66.4	4.42	
Humphrey †	86	41	62.8	2.68	
Ithaca	83	46	65.8	2.74	
Jamestown	84	43	64.1	2.95	
Kings Station	......	......	......	4.70	
Lake George	82	45	65.3	5.02	
Little Falls	86	45	65.4	2.52	
Lockport	86	45	65.8	2.29	
Lowville	83	43	62.8	3.27	
Lyndonville	......	......	......	2.32	
Lyons	87	48	67.0	1.22	
Madison Barracks †	87	35	63.5	1.90	
Middletown	86	50	67.5	3.85	
Mohonk Lake	80	52	67.2	4.11	
Mount Morris	99	40	68.3	0.20	
Newark Valley	......	......	......	3.71	
New Lisbon	85	39	62.2	3.17	
Niagara Falls	......	......	......	3.38	
North Hammond †	88	44	65.8	2.19	
North Lake	80	40	61.2	4.97	
Number Four †	80	40	60.2	4.97	
Ogdensburg	82	38	65.8	1.40	
Oneonta	90	40	66.0	2.43	
Oxford	92	38	64.8	2.68	
Penn Yan	88	48	67.1	1.28	
Perry City	87	40	63.8	2.30	
Phœnix	......	......	......	2.53	
Pine City	......	......	......	4.00	
Pittsford	87	48	65.7	1.13	
Plattsburg Barracks †	82	44	65.2	3.93	
Port Jervis	85	46	67.4	3.65	
Potsdam	86	38	64.7	1.99	
Poughkeepsie	87	43	67.3	2.81	
Primrose	88	48	70.2	3.83	
Ridgeway	82	50	66.6	1.83	
Rome	88	41	64.6	2.71	
Romulus	89	49	67.8	0.78	
Rose	......	......	......	1.15	
St. Johnsville	85	42	64.8	3.28	
Saranac Lake	83	38	62.0	2.56	
Schenevus	......	......	......	2.40	
Scottsville	......	......	......	0.83	
Setauket †	83	53	70.0	5.03	
Sherwood	......	......	......	1.99	
Skaneateles	......	......	......	2.09	
South Canisteo	88	34	62.4	2.69	
Southeast Reservoir	......	......	......	5.21	
South Kortright †	87	38	62.4	6.03	
Straits Corners	89	42[e]	66.4[e]	2.66	
Ticonderoga	86	45	66.8	3.34	
Tyrone	......	......	......	2.05	
Wappingers Falls	86	49	68.5	5.82	
Warwick	......	......	......	2.99	
Watkins	89	43	67.0	1.37	
Waverly †	89	43	66.0	3.21	
Wedgwood	88	46	67.6	3.04	
Westfield	84	47	65.8	3.64	
Westpoint †	86	55	71.2	5.15	
Willetspoint	85	55	70.7	2.26	
North Carolina.					
Abshers	93	51	72.4	3.76	
Asheville †	90	50	70.3	3.20	
Beaufort †	90	64	79.0	5.51	
Biltmore †	90	49	70.7	3.44	
Bryson City †	......	......	......	2.72	
Chapelhill †	95	60	76.8	2.74	
Edenton	95	65	78.0	4.92	
Experimental Farm	94	62	76.9	2.24	
Fairbluff †	......	......	......	2.08	
Fayetteville †	96	58	76.6	5.41	
Flatrock	90	49	69.2	1.97	
Goldsboro †	96	56	77.0	6.70	
Greensboro †	97	58	76.6	4.47	
Greenville	95	62	75.9	1.50	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
North Carolina—Cont'd.	°	°	°	Ins.	Ins.
Henderson †	100	62	77.6	2.72	
Highlands	84	46	65.4	4.04	
Jacksonville	96	61	78.4	2.09	
Lenoir *†[1]	89	57	72.2	3.96	
Linville †	83	45	64.2	2.82	
Littleton †	95	60	75.5	4.06	
Louisburg †	96	60	76.9	3.80	
Lumberton †	96	62	79.2	4.37	
Lynn *†[2]	92	......	72.5	1.76	
Mana	......	......	......	4.38	
Marion	93	54	72.5	2.74	
Moncure †	95	59	76.4	2.74	
Monroe †	91	56	75.0	2.05	
Morganton	96	53	74.8	1.16	
Mountairy †	91	51	72.4[e]	3.47	
Mount Pleasant	94	58	75.6	3.49	
Murphy †	......	......	......	3.50	
Newbern †	94	68	79.3	3.68	
Oakridge †	93	59	74.0	4.70	
Pantego	......	......	......	3.98	
Pittsboro †	94	59	74.4	3.05	
Rockingham †	99	60	78.0	2.98	
Roxboro †	96	58	74.9	2.49	
Salem †	94	53	75.2	4.14	
Salisbury †	98	55	77.0	2.49	
Saxon †	94	52	74.8	3.53	
Selma	98	61	77.0	7.35	
Settle	96	57	75.6	2.08	
Sloan †	95	61	77.8	3.18	
Soapstone Mount †	94	53	71.4	2.84	
Southern Pines *a* †	97	57	77.8	4.01	
Southern Pines *b*	97	59[c]	78.4	4.37	
Southport †	91	65	79.0	5.88	
Springhope *[1]	92	63	74.8	2.60	
Tarboro	99	58	76.8	4.56	
Waynesville †	86	49	68.0	2.73	
Weldon †	98	60	77.2	2.16	
Willeyton	94	58	76.0	2.89	
North Dakota.					
Amenia	85	38	63.4	0.58	
Ashley †	87	35	63.2	1.49	
Buxton	83	42	63.2	......	
Churchs Ferry	90	38	64.6	0.96	
Coalharbor †	98	40	66.8	0.61	
Devils Lake †	88	40	64.2	1.15	
Dunseith	104	38	68.4	1.00	
Ellendale	92	41	64.8	1.59	
Falconer	99	35	65.5	0.47	
Fargo †*	82[a]	35	64.8	0.77	
Forman †	88[d]	34[d]	59.9[d]	2.09	
Fort Yates †	95	41	67.2	1.35	
Gallatin †	90	29	62.6	0.85	
Glenullin	101	39	66.0	0.60	
Goetz	100	31	67.6	0.71	
Grafton †	85	34	62.0	1.66	
Grand Rapids †	86	38	61.6	1.39	
Hamilton	86	36	62.4	3.48	
Jamestown †	82	42	63.6	0.58	
Langdon †	84	35	61.0	1.53	
Larimore †	85	41	62.0	2.39	
Lisbon	87	41	63.4	1.84	
McKinney	100	29	62.1	0.60	
Mayville[1]	85	49	67.7	......	
Medora †	105	40	68.8	1.06	
Milton †	88	37	60.6	1.20	
Minnewaukon	85	35	62.4	0.55	
Minot †	101	33	66.0	0.37	
Minto †	88	34	62.8	1.38	
Napoleon †	88	38	63.0	1.13	
Neche †[2]	84	30	59.6	2.04	
New England City	106	39	64.8	......	
Oakdale †	97	42	66.0	2.48	
Portal	95	38	63.2	1.16	
Power †	86	37	68.2	1.01	
St. John †	90	41	62.4	1.21	
Sheyenne	89	37	63.0	1.15	
Steele †	91	40	63.1	2.94	
Towner †	91	37	62.8	0.16	
University	......	......	......	1.72	
Valley City †	80	35	60.2	0.60	
Wahpeton †	92	38	65.8	1.83	
Whites Ranch	105	40	69.6	0.85	
Wildrice †[2]	......	......	62.4	1.00	
Willow City	97	32	63.3	0.45	
Woodbridge †	87	32	61.0	1.68	
Ohio.					
Akron	91	48	68.2	2.98	
Annapolis	99	40	68.6	2.09	
Ashland	84	48	65.4	4.37	
Ashtabula	85	46	66.6	5.86	
Atwater	......	......	......	3.72	
Bangorville	92	49	68.0	2.28	
Basil	......	......	......	2.77	
Bellefontaine	90	53	71.0	1.35	
Bement	......	......	......	3.66	
Benton Ridge	95	42	69.4	3.62	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd	°	°	°	Ins.	Ins.
Bethany	100	53	73.4	2.70	
Bigprairie	92	44	66.2	3.88	
Binola	......	......	......	3.00	
Bissells	90	46	67.4	5.23	
Bloomingburg	95	49	69.8	3.42	
Bowling Green	93	40	66.8	1.91	
Bucyrus	96	44	69.0	1.50	
Cambridge	93	40	67.8	1.92	
Camp Dennison	97	51	73.0	1.78	
Canal Dover	93	43	67.4	2.69	
Canton †	91	44	67.8	2.40	
Carrollton	101	40	69.0	2.63	
Cedarville	......	......	......	2.26	
Celina	101	43	70.0	2.88	
Cherryfork	101	50[b]	73.2[d]	2.94	
Chillicothe †	96	52	72.0	2.31	
Circleville	94	50	70.3	2.38	
Clarksville	95	50	71.4	3.77	
Cleveland *a*	86	49	67.0	3.98	
Cleveland *b*	87	49	68.1	2.17	
Clifton	97	43	70.7	1.69	
Coalton	98	47	71.8	1.99	
Colebrook	89	45	68.2	8.40	
Dayton *a*	100	46	71.9	2.89	
Dayton *b* †	......	......	......	2.50	
Defiance	92	41	67.2	2.20	
Delaware	95	45	69.7	2.29	
Demos	93	49	69.8	1.74	
Dupont	92	48	69.6	2.12	
Elyria	91	45	67.7	2.94	
Fairport Harbor *[10]	84	52	68.9	......	
Fayetteville	94	53	68.9	3.92	
Findlay	97	45	69.4	3.22	
Frankfort	89	47	69.7	2.08	
Garrettsville †	90	40	65.2	3.42	
Granville	95	43	68.2	4.05	
Gratiot	92	45	68.8	1.84	
Greenfield	95	54	71.4	3.15	
Greenhill	95	38	67.0	2.97	
Greenville	88	48	67.6	2.77	
Hackney	......	......	......	1.67	
Hanging Rock	99	52	73.0	3.42	
Hedges	96	40	67.5	2.86	
Hillhouse	90	44	65.4	4.82	
Hillsboro †	99	49	72.2	4.57	
Hiram	88	49	66.4	3.21	
Hudson	94	42	67.4	4.34	
Jacksonboro	100	50	73.0	1.27	
Kenton †	93	49	69.2	......	
Killbuck	95	39	67.0	3.55	
Lancaster	94	46	69.1	2.02	
Leipsic	94	41	66.5	4.12	
Levering	94	42	67.2	2.17	
Logan	......	......	......	3.07	
Lordstown	89	42	66.2	3.47	
McArthur	97	48	73.2	3.01	
McConnelsville †	96	46	70.6	2.06	
Mansfield †	......	......	......	2.77	
Marietta *b*	92	51	71.6	1.89	
Marion	93	45	69.4	1.50	
Medina	94	43	67.6	2.78	
Milfordton	95	41	68.2	1.65	
Milligan	100	43	72.2	2.37	
Millport	91	38	65.8	1.85	
Montpelier	92	41	67.4	1.31	
Napoleon	94	41	67.2	1.32	
New Alexandria	89	46	68.3	2.18	
New Berlin	94	43	68.4	2.39	
New Bremen	96	45	70.0	2.90	
New Comerstown	94	43	66.2	1.86	
New Holland	98	46	71.4	1.64	
New Moscow	......	......	......	3.15	
New Paris	96	......	......	2.30	
New Waterford	90	40	66.6	2.09	
North Lewisburg	96	45	69.5	2.85	
North Royalton	93	48	68.0	4.67	
Norwalk	92	44	68.2	1.14	
Oberlin	93	45	68.4	1.98	
Ohio State University	95	45	69.6	2.16	
Orangeville	90	42	65.6	3.88	
Ottawa	93	47	69.2	3.28	
Pataskala †	95	43	70.1	3.19	
Perry	......	......	......	6.76	
Philo	99	43	70.2	1.51	
Plattsburg	94	50	69.8	1.93	
Pomeroy	98	53	72.6	2.24	
Portsmouth *a* †	......	......	......	2.63	
Portsmouth *b*	100	51	74.4	2.63	
Richwood	......	......	......	3.17	
Ridgeville Corners	93	41	67.4	1.78	
Ripley	95	53	72.4	2.62	
Rittman	91	41	65.2	5.07	
Rockyridge	93	43	69.3	2.73	
Rosewood	92	45	67.6	2.40	
Shenandoah	97	45	67.6	4.45	
Sidney *b*	96	46	70.4	2.62	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Sinking Spring †	93	52	71.6	3.36	
Somerset †	94	39	74.2	2.90	
Springboro	......	......	......	2.19	
Spring Valley	96	46	70.5	3.29	
Strongsville	......	......	......	3.25	
Sylvania [d]	92	40	66.6	2.23	
Thurman	100	49	74.4	2.36	
Tiffin †	93	49	68.8	1.61	
Upper Sandusky	92	49[i]	69.0[e]	1.88	
Urbana	89	46	68.0	1.87	
Vanceburg	96	52	72.9	2.85	
Van Wert	93	44	67.8	3.57	
Vermillion	88	49	67.4	3.06	
Vickery	91	45	69.2	2.03	
Walnut	......	......	......	2.66	
Warren	92	44	66.1	4.68	
Warsaw	91	45	67.2	2.07	
Wauseon	95	41	68.2	1.88	
Waverly	98	45	72.6	1.72	
Waynesville	96	50	70.8	2.49	
Wellington	96	45	69.1	2.32	
Westerville	90	47	68.5	1.97	
Willoughby	......	......	......	6.71	
Wooster *b* †	92	42	66.8	3.86	
Youngstown	91	42	64.8	5.57	
Zanesville †	......	......	......	2.18	
Oklahoma.					
Alva	108	55	79.6	5.40	
Anadarko †	106	51	78.0	0.92	
Arapaho †	107	55	80.4	1.65	
Burnett †	100	54	77.0	2.32	
Clifton †	103	54	78.0	2.73	
Fort Reno †	103	57	79.1	1.01	
Fort Sill	101	58	79.9	2.37	
Hennessey	106	58	82.2	4.09	
Jefferson	105[d]	58[d]	82.4[d]	5.48	
Keokuk Falls	101	56	78.0	3.59	
Kingfisher	104	54	80.4	3.84	
Mangum †	105	53	78.8	2.91	
Norman †	104	54	79.7	1.60	
Prudence †	104	54	79.0	3.89	
Sac and Fox Agency †	102	53	78.1	2.40	
Stillwater †	100	56	77.2	4.51	
Waukomis	105[j]	65[j]	82.4[j]	2.85	
Winnview †	104	57	81.0	1.08	
Woodward	108	53	79.4	5.21	
Oregon.					
Albany *a*	93	48	69.6	0.48	
Arlington	106[d]	47[d]	78.2[d]	T.	
Ashland *b*	105	41	71.6	0.00	
Aurora *[8]	102	50	73.5	0.48	
Aurora (near)	99	43	68.3	0.48	
Bandon	70	49	58.2	0.14	
Bay City †	78	42	60.4	2.10	
Brownsville *[8]	98	55	72.2	0.20	
Burns	90	35	67.7	0.25	
Burns (near)	98	40	68.6	0.16	
Canyon City	98	39	71.6	0.93	
Cascade Locks	102	50	71.9	1.43	
Comstock *[8]	102	48	69.9	0.23	
Coquille River	......	......	......	0.24	
Corvallis	98	46	68.7	0.38	
Dayville †	100	40	70.0	0.10	
Fairview	88	42	64.9	0.68	
Falls City	......	......	......	0.60	
Fife †	98	35	66.2	T.	
Fort Klamath	93	36	62.2	0.05	
Gardiner	76	49	60.4	0.90	
Glenora	100	38	66.2	1.67	
Government Camp	95	30	62.8	1.20	
Grants Pass *a* †	106	41[e]	71.7	T.	
Heppner	108	42	74.4	0.20	
Hood River (near)	99	48	72.0	0.30	
Irvington	......	......	......	0.19	
Jacksonville	102	50	73.2	0.16	
Joseph	93	37	67.2	0.88	
Junction City *[8]	96	50	69.3	0.22	
Lafayette *[8]	103	54	71.5	0.30	
Lakeview †	97	37	68.0	0.10	
Langlois	83	46	64.2	0.45	
McMinnville	104	42	70.0	0.40	
Merlin *[8]	108	48	73.8	0.00	
Monmouth *[8]	99	53	71.6	0.35	
Mount Angel †	98	45	71.0	0.57	
Nehalem	......	......	......	1.63	
Newbridge	101	39	70.2	0.00	
Newport	68	42	56.4	1.02	
Pendleton	109	36	72.4	0.50	
Prineville	98	31	66.8	0.30	
Riddles *[8]	103	50	72.1	0.00	
Riverside	104	40	72.1	0.10	
Salem *b* †	95	46	68.9	0.28	
Sheridan *[8]	100	53	72.2	0.38	
Silver Lake	101	31	64.4	0.00	
Silverton *[8]	100	54	69.3	0.27	
Siskiyou *[8]	97	50	72.6	0.00	
Oregon—Cont'd.	°	°	°	*Ins.*	*Ins.*
Sparta	96	34	69.4	0.50	
Springfield *[8]	93	52	69.7	0.68	
Stafford	102	45	71.0	0.65	
The Dalles †	108	46	75.4	0.08	
Umatilla	......	......	......	0.01	
Vale	100	39	70.8	T.	
Vernonia	103	36	67.6	0.78	
West Fork *[8]	110	46	69.1	0.15	
Weston	101	40	72.7	0.58	
Williams	101	42	68.4	0.28	
Pennsylvania.					
Altoona	91	48	69.0	2.08	
Aqueduct	94	48	71.2	2.72	
Beaver Dam	......	......	......	1.55	
Bethlehem	......	......	......	3.64	
Blooming Grove	86	42	66.0	4.56	
Brookville †	......	......	......	3.29	
Browers Lock	......	......	......	2.41	
Cameron	......	......	......	1.70	
Canonsburg	94	50	70.8	0.34	
Carlisle	91	51	70.4	5.12	
Cassandra	86	42	64.2	2.40	
Cedarrun	......	......	......	3.88	
Centerhall †	85	47	65.8	2.43	
Chambersburg †	89	47	68.3	6.02	
Coatesville	90	51	72.4	3.00	
Confluence †	93	47	68.2	2.56	
Coopersburg	85	52	70.4	2.92	
Davis Island Dam †	......	......	......	1.52	
Derry Station	95	42	68.8	3.40	
Doylestown	......	......	......	3.87	
Driftwood	......	......	......	3.07	
Dubois	......	......	......	2.23	
Duncannon	......	......	......	2.51	
Dushore	85	37	63.4	3.44	
Dyberry	86	39	64.6	2.83	
East Bloomsburg	......	......	......	1.40	
East Mauch Chunk	90	46	69.4	2.94	
Easton	88	52	70.0	3.20	
Edinboro *[1]	83	44	64.4	......	
Ellwood Junction †	......	......	......	2.65	
Emporium	86	45	65.4	2.13	
Everett	90	44	66.8	2.44	
Farrandsville	......	......	......	3.72	
Forks of Neshaminy *[1]	82	62	72.0	3.09	
Franklin	89	45	66.8	5.00	
Frederick	......	......	......	2.19	
Freeport †	......	......	......	2.69	
Girardville	......	......	......	2.64	
Grampian	92	44	66.5	2.46	
Greensboro †	97	......	......	1.86	
Greenville	87	41	64.0	4.88	
Hallstead †	88	42	66.9	1.86	
Hamburg	91	50	71.6	4.16	
Hollidaysburg [d]	92	44	67.9	1.95	
Huntingdon *a* †	91	41	68.4	3.38	
Huntingdon *b*	......	......	......	3.90	
Indiana	88	46	68.0	......	
Irwin	......	......	......	2.33	
Johnstown †	......	......	......	2.23	
Karthaus	......	......	......	0.84	
Keating	......	......	......	2.99	
Kennett Square	89	52	71.7	2.77	
Lansdale	......	......	......	3.20	
Lawrenceville	89	44	66.4	3.27	
Lebanon	89	50	70.0	2.51	
Leroy †	85	47	65.2	4.40	
Lewisburg	93	45	68.8	2.52	
Lock Haven *a* †	94	34	65.2	2.32	
Lock Haven *b*	......	......	......	3.94	
Lock No. 4 †	......	......	......	1.64	
Lycippus	91	48	69.5	4.52	
Mifflin	......	......	......	3.40	
Oil City †	......	......	......	5.07	
Ottsville	......	......	......	4.87	
Parker †	......	......	......	3.82	
Philadelphia *b*	89	60	73.7	3.27	
Point Pleasant	......	......	......	2.93	
Pottstown	89	54	72.2	2.64	
Quakertown	87	47	69.4	3.43	
Reading[2]	......	......	70.4	2.54	
Renovo *a*	......	......	......	4.28	
Renovo *b*	90	48	67.8	3.79	
Ridgway †	......	......	......	2.80	
Saegerstown	90	38	64.0	6.63	
St. Marys	88	41	63.8	2.54	
Salem Corners	85	49	67.4	5.51	
Scranton	91	40	68.0	2.57	
Seisholtzville	......	......	......	3.27	
Selinsgrove	90	48	69.6	1.88	
Shawmont	......	......	......	3.60	
Shinglehouse	89	38	62.7	2.31	
Sinnamahoning	......	......	......	1.44	
Smethport	88	40	63.0	3.25	
Smiths Corners	......	......	......	3.75	
Somerset	85	40	63.8	3.11	
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
South Bethlehem	89	55	72.6	......	
South Eaton	86	46	66.8	3.23	
State College	87	45	66.0	3.39	
Sunbury	......	......	......	1.60	
Swarthmore	90	56	72.2	3.34	
Swiftwater	81	44	64.5	8.60	
Towanda	88	41	66.4	1.78	
Uniontown	91	46	68.4	2.15	
Warren †	85	43	63.9	......	
Wellsboro †	88	40	64.7	1.84	
West Chester	86	56	71.8	2.58	
West Newton †	......	......	......	1.89	
White Haven	87	43	66.0	3.48	
Wilkesbarre †	92	47	69.8	2.57	
Williamsport	88	49	67.1	5.83	
York †	89	50	70.0	4.04	
Rhode Island.					
Kingston	83	48	67.2	4.31	
Providence *a*	87	54	71.6	4.47	
South Carolina.					
Allendale †	99	62	79.2	5.90	
Anderson †	......	......	......	6.32	
Batesburg †	98	63	78.4	6.54	
Blackville †	98	64	76.6	5.24	
Camden †	......	......	......	3.18	
Central †	99	60	77.0	......	
Cheraw *a* †	98	59	77.5	2.92	
Cheraw *b* †	......	......	......	3.27	
Clemson College	101	58	76.7	2.44	
Conway †	......	......	......	5.76	
Darlington (near)	......	......	......	1.94	
Edisto †	......	......	......	3.49	
Effingham †	......	......	......	4.26	
Florence †	96	58	77.3	4.32	
Gaffney †	......	......	......	4.12	
Georgetown †	96	71	82.8	4.30	
Gillisonville †	102	61	80.6	......	
Greenville †	95	58	74.8	3.45	
Greenwood	97	63	78.1	3.14	
Holland	96	60	77.4	2.66	
Kingstree *a* †	98	63	79.6	4.72	
Kingstree *b*	......	......	......	4.72	
Little Mountain	99	61	77.8	4.41	
Longshore †	96	62	77.0	3.62	
Mount Carmel †	......	......	......	6.38	
Pinopolis *[1]	91	68	77.2	6.99	
Port Royal †	95	69	81.6	7.88	
St. George †	95	62	78.8	8.80	
St. Matthews †	97	62	79.1	6.65	
St. Stephens †	......	......	......	6.35	
Santuck †	95	60	76.0	3.20	
Shaws Fork *[1]	96	65	78.1	8.44	
Smiths Mills †	......	......	......	6.90	
Society Hill †	92	61	76.2	2.94	
Spartanburg	97	59	75.8	4.42	
Statesburg †	93	63	77.5	8.06	
Trenton	93[e]	67[e]	78.8[e]	9.93	
Trial †	95	63	77.8	9.48	
Walhalla	95	57	74.0	3.47	
Winnsboro	94	62	78.2	1.27	
Yemassee †	98	64	80.8	5.25	
Yorkville	97	62	77.2	5.93	
South Dakota.					
Aberdeen †	89	42	64.2	3.61	
Alexandria †	96	39	65.4	4.96	
Armour †	99	42	67.7	1.01	
Ashcroft †	102	35	68.4	1.12	
Brookings †	91	37	63.6	3.59	
Canton	95	44	67.2	2.17	
Castlewood †	92[e]	37[e]	63.4[e]	3.01	
Centerville	......	......	......	1.67	
Chamberlain †	97	46	70.4	2.62	
Clark	......	......	......	2.74	
Cross †	97	39	62.8	2.75	
Doland	95	42	65.4	3.19	
Edgemont	......	......	......	0.04	
Flandreau	90	43	63.6	3.82	
Forestburg †	94	40	66.6	2.69	
Forest City	......	......	......	1.80	
Fort Meade †	102	49	68.8	3.11	
Gary	92	44	63.6	1.69	
Goudyville	97	38	65.6	1.98	
Greenwood	......	......	......	1.17	
Hotch City †	103	41	68.0	1.49	
Hot Springs	93	52	69.2	0.98	
Howard †	93	40	66.0	3.60	
Kimball †	98	43	68.7	2.75	
Leslie †	107	45	71.8	2.35	
Mellette †	95	38	66.2	2.55	
Menno †	99	39	69.8	1.14	
Millbank	93	40	65.6	0.58	
Mitchell †	97	38	65.8	3.74	
Nowlin	109	43	70.1	1.01	
Oelrichs †	103	46	69.8	2.20	
Parker †	95	37	66.6	1.89	
Parkston †	96	44	67.6	2.13	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
South Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Plankinton †	97	40	67.8	1.98	
Rosebud	102	45	70.8	2.90	
Silver City	......	......	......	3.10	
Sioux Falls†	94	39	65.6	2.90	
Spearfish†	94	50	67.8	1.28	
Tyndall†	93	40	67.7	1.10	
Watertown	86	37	62.6	2.88	
Wentworth†	90	40	64.2	2.62	
Wessington Springs	92	42	65.2	2.60	
Tennessee.					
Andersonville	93	50	72.8	3.07	
Arlington†	101	57	78.0	4.32	
Arthur†	......	......	......	2.33	
Ashwood *†1	101	61	79.0	2.32	
Benton (near)†	95	58	76.0	3.27	
Bluff City†	......	......	......	1.11	
Bolivar†	102	55	78.0	1.27	
Bristol†	90	54	70.8	3.18	
Brownsville†	104	53	79.9	0.43	
Byrdstown	94	54	73.8	5.22	
Cagle	92	55	72.6	2.21	
Carthage†	......	......	......	3.65	
Clinton†	......	......	......	4.85	
Covington	104	60	80.2	0.16	
Decatur†	96	55	75.1	4.04	
Dyersburg	103	56	78.6	0.63	
Elizabethton†	96	54	74.0	3.06	
Elk Valley	96	56	74.1	4.69	
Erasmus	91	46	70.0	3.57	
Florence†	97	55	76.9	1.61	
Franklin	98	55	76.6	5.68	
Grace	......	......	......	1.02	
Greeneville†	93	53	72.4	2.35	
Harriman	94	55	74.4	5.29	
Hickory Withe	104	58	79.0	5.64	
Hohenwald †	98	43	74.6	2.34	
Jackson†	102	54	78.8	0.92	
Johnsonville†	100	53	77.9	3.38	
Jonesboro*1	90	61	71.2	2.98	
Kingston†	......	......	......	5.86	
Liberty†	......	......	......	3.12	
Lynnville†	98	56	75.8	3.47	
McKenzie†	102	57	79.0	1.62	
McMinnville†	94	55	75.8	3.05	
Milan†	104	57	79.8	2.22	
Molino†	99	60	77.6	5.42	
New Market*1	91	61	72.8	4.03	
Newport†	95	56	74.9	1.98	
Nunnelly*1	100	50	76.4	2.46	
Oak Hill*1	100	57	74.9	3.10	
Palmetto†	96	58	77.6	3.02	
Peryear	......	......	......	0.11	
Pope	101	52	77.7	0.27	
Riddleton†	97	54	75.9	4.19	
Rogersville†	90	51	71.5	1.41	
Rugby	92	49	71.9	6.40	
St. Joseph†	105	51	78.1	4.02	
Savannah	104	52	80.0	2.41	
Sewanee†	88	59	71.8	3.36	
Silver Lake*1	85	49	67.1	4.71	
Springdale*1	90	58	74.3	2.52	
Sylvia	105	52	78.8	2.62	
Tellico Plains†	96	57	75.8	2.46	
Tracy City	92	51	71.7	3.23	
Trenton	100	54	76.6	1.62	
Tullahoma†	95	52	73.5	1.85	
Union City†	100	55	77.0	0.74	
Waynesboro	101	52	76.8	2.98	
Texas.					
Albany	......	......	......	1.64	
Aransas Pass	95	71	83.7	1.36	
Arthur City†	......	......	......	1.58	
Austin b*5	100	62	82.2	......	
Ballinger†	101	60	80.0	3.67	
Beeville†	104	67	84.3	3.39	
Blanco†	100	......	......	3.16	
Boerne*1	102	64	80.8	4.03	
Brazoria†	99	70	82.1	5.09	
Bremond*1	105	71	86.5	0.85	
Brenham†	101	66	82.9	3.77	
Brighton†	99	69	82.0	2.45	
Brownwood	......	......	......	2.80	
Burnet*1	101	65	82.2	3.83	
Camp Eagle Pass†	108	68	85.4	1.98	
Childress	101	60	80.7	0.27	
Coleman*4	......	63	78.4	2.90	
College Station5	97	......	83.1	4.68	
Colmesneil	......	......	......	5.13	
Columbia†	98	68	81.6	2.70	
Corsicana b†	104	64	85.6	0.68	
Cuero†	98	68	83.0	1.45	
Dallas†	106	59	82.6	1.22	
Danevang†	100	66	83.1	3.42	
Dublin†	104	61	81.3	1.01	
Duval*1	108	72	86.8	1.17	
Emory	108	58	82.2	4.92	
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Estelle†	107	59	82.1	1.32	
Forestburg†	103	60	81.4	2.30	
Fort Brown	99	67	84.4	4.63	
Fort Clark	103	66	84.4	1.16	
Fort McIntosh	106	70	85.0	7.22	
Fort Ringgold†	102	69	83.8	4.61	
Fort Stockton	......	......	......	5.38	
Fort Worth†	105	63	83.3	2.17	
Fredericksburg*†1	100	61	80.8	4.14	
Fruitland	104	62	83.1	0.54	
Gainesville†	101	58	81.0	2.82	
Georgetown	......	......	......	3.52	
Golindo	......	......	......	1.15	
Grapevine†	104	61	83.0	2.63	
Hale Center†	98	60	76.4	2.00	
Hallettsville†	102	68	84.3	4.08	
Haskell1	105*	55	84.1	1.27	
Hearne†	103	64	83.8	2.70	
Henrietta†	106	61	84.4	1.06	
Hewitt	......	......	......	3.95	
Houston†	101	70	82.2	7.53	
Huntsville†	102	64	82.6	2.98	
Junction City	101	54	79.4	2.74	
Kent	......	......	......	1.97	
Kerrville	96	57	78.8	3.39	
Lampasas†	106	58	81.0	2.36	
Langtry	102	......	......	2.71	
Llano*†5	103	66	81.0	2.90	
Longview†	105	61	83.6	1.70	
Luling†	102	65	84.0	0.98	
Mann	108	60	85.6	0.20	
Marathon	98	......	......	2.63	
Menardville	102	51	79.3	3.20	
Midland	103	55	77.4	2.86	
Mount Blanco†	96	58	76.0	2.31	
New Braunfels†	100	65	82.5	1.91	
Orange†	98	67	80.4	1.37	
Panter	......	......	......	2.56	
Paris†	107	60	83.3	0.32	
Point Isabel*1	94	76	83.4	0.35	
Rheinland†	105	62	83.6	0.80	
Roby	102	58	80.5	1.17	
Rocksprings	......	......	......	2.62	
Runge†	103	65	85.4	0.71	
San Antonio	102	66	84.3	0.46	
Sanderson†	101	56	76.3	3.40	
San Marcos b†	100	62	82.0	2.07	
Stafford†	102	67	82.8	3.21	
Sulphur Springs†	108	60	84.2	3.38	
Temple a	103	63	82.8	2.70	
Temple b	104	63	82.8	2.65	
Tivoli1	95	67	80.2	2.54	
Tyler	104	61	83.2	1.40	
Valentine†	95	50	77.8	2.50	
Waco†	104	63	85.2	0.18	
Waxahachie†	108	60	83.9	1.30	
Weatherford†	105	60	82.4	2.94	
Wichita Falls†	......	......	......	1.75	
Utah.					
Alpine City†	......	......	......	0.08	
Blue Creek*8	98	48	69.5	T.	
Brigham City†	......	......	......	0.29	
Cisco†	102	54	78.0	0.15	
Corinne	98	40	76.7	T.	
Croydon	95	38	68.0	T.	
Ferron	93	45	73.7	0.40	
Fillmore†	109	40	75.9	0.31	
Fort Duchesne†	97	39	69.6	0.21	
Frisco	95	53	74.9	0.19	
Giles†	103	52	72.5	0.69	
Heber	96	36	65.2	0.49	
Kelton*8	98	50	74.9	......	
Levan†	93	48	70.8	0.14	
Loa†	92	35	63.2	1.39	
Logan†	95	50	73.0	0.25	
Manti†	106	40	72.4	......	
Millville	......	......	......	0.47	
Minersville	95	52	73.8	0.49	
Moab†	91	54	72.8	0.60	
Mount Pleasant†	111	48	74.4	0.05	
Ogden a*8	94	50	76.9	0.00	
Ogden b	96	46	73.6	0.00	
Pahreah	99	48	74.8	1.00	
Park City†	82	39	60.4	0.15	
Parowan†	93	48	70.5	1.56	
Pinto	92	40	67.6	0.89	
Promontory*8	102	50	76.7	0.10	
Richfield†	98	40	68.2	0.25	
St. George†	110	52	81.6	0.45	
Scipio†	93	38	69.2	0.38	
Snowville	94	44	70.4	0.00	
Soldier Summit†	95	31	62.2	0.06	
Terrace*8	98	60	78.5	0.00	
Thistle†	98	43	70.0	0.66	
Tooele†	91	52	74.4	0.51	
Vernal	89	49	70.2	0.26	
Utah—Cont'd.	°	°	°	*Ins.*	*Ins.*
Woodruff	84	34	56.9	0.40	
Vermont.					
Brattleboro	86	42	67.4	2.93	
Burlington †	84	49	67.7	4.08	
Chelsea †	80	42	62.2	4.08	
Cornwall	85	45	65.8	3.23	
Enosburg Falls	......	......	......	2.77	
Hartland †	82	39	62.7	2.32	
Jacksonville	81	36	60.6	2.90	
St. Johnsbury	81	43	63.6	3.19	
Strafford *†1	78	46	62.8	6.32	
Vernon *6	86	52	67.2	2.98	
Wells	83	44	64.5	5.74	
Woodstock	83	42	63.8	1.61	
Virginia.					
Alexandria	91	57	73.8	2.73	
Ashland †	95	56	75.6	2.28	
Barboursville	92	56	73.7	2.08	
Bedford City	96	55	74.1	0.87	
Bigstone Gap†	91	48	68.5	2.85	
Birdsnest *†1	90	67	77.5	3.65	
Blacksburg	91	49	67.7	3.49	
Buckingham †	96	55	74.1	0.73	
Burkes Garden	88	49	68.1	3.22	
Callaville †	93	59	75.2	2.52	
Christiansburg †	......	......	......	3.23	
Clarksville	......	......	......	1.16	
Clifton Forge	90	52	67.7	4.32	
Dale Enterprise†	95	47	70.4	0.68	
Danville†	......	......	......	5.17	
Doswell	98	47	76.6	2.40	
Dwale	......	......	......	3.24	
Farmville	100	58	77.0	0.33	
Fredericksburg †	95	57	75.8	2.04	
Gordonsville	88	60	73.0	......	
Grahams Forge	89	49	68.6	3.62	
Hampton	91	65	77.7	2.42	
Hot Springs	92	57	73.6	1.08	
Leesburg	......	52	......	1.46	
Lexington †	92	53	72.0	3.03	
Maidens	......	......	......	1.04	
Manassas†	94	55	74.1	3.29	
Marion †	......	......	......	4.63	
Monterey	90	48	66.5	1.60	
Nottoway	100	58	78.2	1.25	
Petersburg †	100	58	77.3	1.20	
Quantico	92	55	73.8	......	
Richmond (near)†	100	56	78.0	1.73	
Rockymount †	94	55	74.4	2.65	
Salem †	93	60	75.4	1.76	
Speers Ferry	......	......	......	3.76	
Spottsville †	95	58	76.6	2.91	
Stanardsville†	91	55	72.6	2.27	
Staunton †	94	53	72.3	2.30	
Stephens City †	94	53	73.0	3.32	
Sunbeam†	94	61	75.8	3.04	
Swords Creek	92	48	69.2	2.44	
Warrenton	91	64	76.4	1.78	
Warsaw †	91	56	75.0	5.62	
Westbrook Farm	95	57	76.4	......	
Woodstock †	98	53	74.0	2.74	
Wytheville †	93	54	71.4	4.13	
Washington.					
Aberdeen	90	45	63.8	1.08	
Anacortes	......	......	......	0.86	
Ashford †	......	......	......	0.95	
Blaine †	84	36	61.2	0.60	
Cascade Tunnel	106	36	65.4	......	
Centerville†	107	36	71.2	0.07	
Chehalis †	102	41	68.8	0.47	
Colfax †	98	36	67.2	0.32	
Coupeville †	84	46	63.0	0.85	
Dayton	101	39	68.2	0.49	
Ellensburg (near)	104	40	73.2	T.	
Fort Simcoe †	109	41	78.0	0.00	
Fort Spokane	104	38	71.1	0.65	
Grandmound †	96	39	67.2	0.48	
Hunters †	90	33	62.4	0.54	
Kennewick †	106	42	77.4	0.07	
La Center	99	48	70.1	0.79	
Lakeside	99	48	74.8	0.15	
Lapush	73	43	57.3	3.06	
Lind	108	43	76.7	0.03	
Loomis †	102	49	75.2	0.23	
Madrone †	88	48	65.2	0.28	
Mayfield †.	96	43	67.0	0.75	
Moxee Valley †	108	39	73.8	0.05	
New Whatcom	87	41	65.6	0.50	
Olga	81	46	60.2	0.61	
Olympia †	93	42	66.8	0.36	
Pinehill †	104	43	72.8	0.10	
Pomeroy	104	55	78.6	0.10	
Port Townsend	85	48	63.8	0.78	
Pullman †	100	37	70.2	0.54	
Rosalia †	98	34	69.0	0.31	
Sedro †	89	40	65.6	0.53	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Washington—Cont'd.	°	°	°	*Ins.*	*Ins.*
Snohomish†	89[4]	43[4]	66.4[4]	0.28	
Southbend	95	42	65.2	0.86	
Stampede	94[i]	38[i]	65.3[i]	0.34	
Stillaguamish	88	39	63.2	0.74	
Sunnyside†	105	43	74.4	0.21	
Union City†	88	44	65.5	0.54	
Vashon†	85	46	64.6	0.37	
Waterville†	102	33	69.6	0.04	
Wenatchee Lake	100	32	64.0	0.10	
West Virginia.					
Beckley	94	42	66.2	0.77	
Beverly†	90	50	71.6	4.15	
Bluefield†	95	51	70.7	2.34	
Buckhannon *a*†	......	......	......	2.49	
Buckhannon *b*	91	49	70.5	......	
Burlington†	92	46	70.3	1.68	
Charleston†	......	......	......	3.22	
Dayton†	92	49	68.6	3.59	
Eastbank*[1]	93	50	70.0	1.28	
Elkhorn†	91	53	70.1	3.06	
Fairmont†	......	......	......	2.00	
Glenville†	92	52	70.0	3.36	
Grafton†	93	49	69.5	2.82	
Green Sulphur	92	50	70.6	0.85	
Harpers Ferry†	......	......	......	4.50	
Hewett†	96	50	74.6	3.15	
Hinton *a*†	......	......	......	2.55	
Hinton *b*†	94	55	72.5	......	
Huntington	95	55	73.0	4.07	
Kingwood	87	48	65.4	5.02	
Marlinton†	89	49	67.1	2.74	
Martinsburg†	93	54	71.5	2.78	
Morgantown *b*†	94	50	70.1	3.04	
New Martinsville†	100	53	73.1	1.89	
Nuttallburg†	88	51	69.8	1.85	
Oldfields†	94	48	69.8	2.95	
Philippi†	89	......	......	5.75	
Point Pleasant†	99	55	74.0	4.82	
Powellton	92	54	70.4	3.11	
Romney	90	49	70.1	2.06	
Rowlesburg†	......	......	......	4.52	
Weston *b**†[1]	98	54	71.6	......	
Wheeling *a*†	......	......	......	2.00	
Wheeling *b*†	96	50	72.2	2.14	
White Sulphur Springs†	93	50	72.6	5.93	
Wisconsin.					
Amherst	85	37	63.8	1.90	
Antigo	85	32	63.0	1.66	
Barron	85	32	61.2	1.25	
Bayfield	84	43	63.6	3.39	
Beloit	91	43	69.0	3.02	
Butternut	93	33	64.6	1.31	
Chilton	87	39	65.2	0.97	
Citypoint	87	46	66.2	5.25	
Crandon†	93	28	66.7	1.15	
Delavan	92	40	67.4	1.53	
Dodgeville†	88	43	64.4	3.69	
Easton†	84	36	63.6	2.40	
Florence†	85	33	61.8	1.30	
Fond du Lac	84	42	64.8	2.25	
Grand River Locks	......	......	......	2.97	
Grantsburg†	88	38	64.7	2.00	
Gratiot	97	39	67.2	0.55	
Hartford	......	......	......	3.90	
Hartland	86	40	65.8	3.11	
Harvey	86	44	67.1	2.47	
Hayward	......	......	......	4.30	
Hillsboro	85	37	63.8	......	
Hudson	......	......	......	2.15	
Koepenick*†[1]	84	48	62.2	2.30	
Lancaster†	91	42	66.6	1.06	
Lincoln† f	84	42	65.8	0.68	
Madison†	83	49	67.4	2.73	
Manitowoc†	84	44	65.2	1.37	
Meadow Valley†	85	37	63.6	4.51	
Medford†	95	32	63.4	2.59	
Menasha	......	......	......	1.47	
Neillsville†	84	36	63.4	4.41	
New Holstein	81	42	64.1	2.40	
New London	85	43	64.2	2.62	
Oconto	84	38	64.5	2.07	
Osceola†	87	33	63.1	1.35	
Oshkosh†	84	43	65.4	2.93	
Pepin	91	38	64.0	3.47	
Pine River†	85	41	64.9	2.31	
Portage†	85	44	62.8	3.89	
Port Washington	89	45	66.2	1.37	
Prairie du Chien	93	43	69.0	0.80	
Wisconsin—Cont'd.	°	°	°	*Ins.*	*Ins.*
Racine	89	48	68.5	2.47	
Shawano	83	37	62.8	1.25	
Spooner†	88	36	64.5	2.24	
Stevens Point†	89	37	64.3	1.72	
Sturgeon Bay Canal*[10]	86	41	64.6	......	
Valley Junction†	85	36	63.0	3.10	
Viroqua	85	44	65.2	2.82	
Watertown†	85	43	65.4	2.66	
Waukesha†	85	47	64.0	3.02	
Waupaca†	86	41	65.6	1.40	
Wausau†	88	35	61.1	2.91	
Wausaukee	85	41	64.5	1.61	
Westbend	84	42	65.1	1.91	
Westfield†	84	43	65.8	2.80	
Whitehall	87	36	64.8	3.73	
White Mound†	91	36	64.8	4.50	
Wyoming.					
Atlantic City	87	31	65.0	1.41	
Big Horn Ranch	88	33	60.9	0.79	
Carbon	101	37	68.4	0.61	
Fort Laramie†	99	42	70.0	2.06	
Fort Washakie	91	42	65.1	0.30	
Fort Yellowstone†	88	37	62.5	0.57	
Laramie	83	35	60.4	1.11	
Lusk†	95	41	66.2	2.32	
Sheridan	95	39	65.9	1.10	
Strong	94 c	40 c	66.9 c	0.01	
Sundance	89	40	63.6	2.48	
Wheatland	98	46	71.0	2.60	
Mexico.					
Ciudad P. Diaz	99	70	84.0	2.14	
Leon de Aldamas	86	55	69.9	3.56	
Topolobampo*[1]	96	79	85.9	1.44	
New Brunswick.					
St. John	75	49	61.7	3.90	
West Indies.					
Grand Turk Island	......	......	......	0.32	

Late reports for July, 1897.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.					
Livingston	101	64	83.5	3.37	
Thomasville	99	61	83.0	8.47	
Arizona.					
Ariz. Canal Co. Dam	110	66	89.1	0.19	
Benson*[8]	98	77	89.8	9.65	
California.					
Adin	93	39	67.1	0.14	
Agnews	82	40	60.9	0.00	
Nevada City	93	42	68.8	0.00	
San Miguel Island	81	49	60.9	0.00	
Florida.					
Plant City	95	66	81.4	10.85	
Idaho.					
Moscow	92 f	38 h	65.8 e	0.85	
Oakley	103	36	68.7	0.85	
Paris	93	30	61.5	0.62	
Illinois.					
Rockford	100	53	77.4	2.71	
Kansas.					
Augusta	103	50	80.4	1.66	
Louisiana.					
Lake Providence	......	......	......	1.75	
Massachusetts.					
Wakefield	......	......	......	3.60	
Michigan.					
Badaxe	101	54	73.0	3.16	
Bois Blanc*[10]	94	50	69.8	......	
Camden	97	55	73.4	1.69	
Coldwater	99	53	73.9	4.64	
Grande Pte. au Sable*[10]	88	52	67.8	......	
Ottawa Point*[10]	96	58	71.7	......	
Minnesota.					
Campbell	94	46	70.6	4.20	
Granite Falls[5]	95	51	72.6	5.25	
Winnebago City	96	52	73.3	4.34	
Missouri.					
Eightmile*[1]	100	55	76.7	2.76	
Sedalia	99	52	78.2	2.21	
Wheatland	......	......	......	2.00	
Montana.					
Glasgow	102	42	69.5	0.74	
Monarch	101	34	59.3	3.25	
Nebraska.					
State Farm	104	50	79.0	3.44	
Nevada.	°	°	°	*Ins.*	*Ins.*
Darrough Ranch	......	......	......	0.31	
Sodaville	102	51	77.6	0.88	
New Mexico.					
Socorro	98	56	76.2	2.03	
New York.					
Potsdam	94	54	71.4	7.04	
North Dakota.					
Fort Berthold	103	34	69.6	0.15	
Lisbon	93	49	69.0	6.41	
Neche	92	43	65.6	7.35	
Portal	93	43	66.5	1.34	
Oregon.					
Happy Valley	92	28	59.4	0.33	
Tillamook Rock L. H.	......	......	......	1.55	
Pennsylvania.					
Indiana	95	40	69.6	......	
Rhode Island.					
Providence *a*	95	58	75.3	5.56	
South Carolina.					
Clemson College	101	55	78.8	2.75	
South Dakota.					
Burnside	......	......	......	2.91	
Faulkton	96	52	71.2	3.70	
Gary	99	50	72.4	4.37	
Greenwood	......	......	......	3.61	
Nowlin j	106	50	75.8	1.10	
Texas.					
Albany	......	......	......	0.72	
Boerne*[1]	104	66	84.4	1.82	
Panter	......	......	......	2.18	
Washington.					
Anacortes	......	......	......	1.19	
Wisconsin.					
Two Rivers*[10]	88	58	71.0	......	
Wyoming.					
Fort Washakie	92	41	64.8	0.98	

EXPLANATION OF SIGNS.

* Extremes of temperature from observed readings of dry thermometer.

† Weather Bureau instruments.

‡ Record furnished by the Arrowhead Reservoir Company, in the San Bernardino Mountains, San Bernardino County, Cal., at elevations varying from 5,150 to 5,350 feet.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. ÷ 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.
[7] Mean from hourly readings of thermograph.
[8] Mean of 7 a. m. + 2 p. m. + 9 p. m. ÷ 3.
[9] Mean of sunrise and noon.
[10] Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "n" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS.

Table I, from March to July, 1897, inclusive, the elevation of the anemometer at Sioux City, Iowa, should read 164 instead of 109 feet.

Florida, Orlando, July, 1897, make maximum temperature read 94 instead of 99.

Texas, Henrietta, July, 1897, make minimum and mean temperature and total precipitation read 59, 86.4 and 1.51 instead of 65, 87.0 and 1.43.

TABLE III.—*Data from Canadian stations for the month of August*, 1897.

Stations.	Pressure. Mean not reduced.	Pressure. Mean reduced.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Precipitation. Total.	Precipitation. Departure from normal.	Prevailing direction of wind.	Total depth of snow.
	Inches.	*Inches.*	*Inches.*	°	°	*Inches*	*Inches.*		
St. Johns, N. F	......	......	......	......	......	......	......	......	
Sydney, C. B. I	29.92	29.98	+ .02	62.8	— 0.5	3.86	— 0.04	sw.	
Grindstone, G. St. L.	......	......	......	......	......	......	......	......	
Halifax, N. S	29.87	30.00	+ .02	63.0	— 0.6	5.18	+ 1.62	sw.	
Grand Manan, N. B.	29.88	29.93	— .03	61.2	— 0.3	2.78	— 0.31	w.	
Yarmouth, N. S.	29.91	29.99	— .01	60.2	0.0	3.48	+ 0.26	s.	
Charlottet'n, P. E. I.	29.90	29.94	— .01	64.6	+ 0.3	3.10	— 0.30	w.	
Chatham, N. B	29.89	29.91	— .03	62.4	— 0.8	3.14	— 1.00	w.	
Father Point, Que.	29.84	29.87	— .04	54.4	— 1.2	3.97	+ 1.41	w.	
Quebec, Que	29.58	29.90	— .05	60.4	— 2.7	4.36	+ 0.94	sw.	
Montreal, Que	29.71	29.91	— .04	63.4	— 3.0	1.95	— 0.22	sw.	
Rockliffe, Ont	29.41	29.91	— .03	58.1	— 3.4	3.11	+ 0.18	nw.	
Kingston, Ont	29.64	29.95	— .02	65.2	— 1.8	1.19	— 0.80	w.	
Toronto, Ont	29.60	29.98	— .01	63.8	— 2.2	2.26	— 0.30	nw.	
White River, Ont	28.62	29.95	— .03	55.1	— 1.3	3.50	+ 0.44	w.	
Port Stanley, Ont	29.36	29.99	.00	63.4	— 2.5	4.04	+ 1.65	w.	
Saugeen, Ont	29.26	29.96	— .02	62.5	— 1.3	5.05	+ 3.27	nw.	
Parry Sound, Ont	29.26	29.94	— .03	61.0	— 2.5	3.65	+ 0.97	w.	
Port Arthur, Ont	29.24	29.92	— .01	59.3	— 0.2	4.65	+ 2.28	w.	
Winnipeg, Man	29.13	29.94	+ .03	59.6	— 3.8	1.00	— 2.46	w.	
Minnedosa, Man	28.20	29.96	+ .07	59.0	— 0.4	1.76	— 0.10	nw.	
Qu'Appelle, Assin	27.75	29.94	+ .04	61.4	— 0.1	1.24	— 0.23	s.	
Medicine Hat, Assin	27.70	29.92	+ .02	67.2	+ 1.5	0.40	— 0.59	w.	
Swift Curr't, Assin.	27.46	29.96	+ .04	64.2	+ 0.2	1.28	— 0.46	n.	
Calgary, Alberta	26.48	29.93	+ .03	60.2	+ 0.8	2.13	+ 0.36	w.	
Prince Albert, Sask.	28.39	29.86	....	59.8	+ 0.9	1.30	....	nw.	
Edmonton, Alberta	27.68	29.96	+ .05	60.2	+ 1.4	1.23	— 0.60	w.	
Battleford, Sask	28.26	29.94	....	62.4	— 0.2	1.57	....	se.	
Kamloops, B. C.	28.64	29.83	....	70.6	....	0.44	....	sw.	
Hamilton, Bermuda	30.00	30.16	+ .06	79.9	+ 0.3	7.38	....	s.	
Banff, Alberta	25.45	30.00	....	53.8	....	1.34	....	sw.	
Esquimalt, B. C.	29.95	29.98	....	58.6	— 0.5	0.28	....	s.	
Ottawa, Ont	29.60	29.95	....	62.6	— 2.2	3.40	....	w.	
July, 1897.									
Kamloops, B. C	28.69	29.90	....	64.8	....	3.18	....	se.	

TABLE IV.—*Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.*

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, —0.06, is still to be applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10. Two directions of wind, connected by a dash, indicate change from one to the other; also same for force.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

June, 1897.	Pressure at sea level. 6 a. m.	3 p. m.	9 p. m.	Temperature. 6 a. m.	2 p. m.	9 p. m.	Maximum.	Minimum.	Relative humidity. 6 a. m.	2 p. m.	9 p. m.	Wind. Direction.	Force.	Cloudiness.	Rain measured at 6 a. m.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%	%				*Ins.*
1	30.13	30.09	30.11	74	84	74	84	72	70	51	73	ene.	4	3	0.00
2	30.11	30.05	30.10	74	81	74	83	72	73	59	70	nne.	3-0	5	0.01
3	30.12	30.07	30.13	74	81	72	83	72	73	64	86	ne.	4-0	7	0.05
4	30.13	30.06	30.13	71	81	74	83	70	76	50	70	ne.	3-0	2	0.05
5	30.12	30.07	30.12	70	81	73	81	68	81	56	70	ene.	3	8	0.07
6	30.09	30.04	30.10	71	79	74	80	70	80	64	70	ne.	3	7	0.02
7	30.10	30.03	30.07	70	79	73	80	68	80	66	75	ne.	3	5	0.05
8	30.08	30.02	30.07	72	81	73	81	69	77	61	81	ene.	2	7	0.09
9	30.06	30.01	30.02	70	82	74	82	70	86	48	70	ne.	2	7	0.05
10	30.05	30.00	30.05	71	80	73	82	70	72	52	72	ne.	3	7	0.02
11	30.06	30.02	30.08	70	79	72	80	70	88	74	77	ne.	3	7	0.02
12	30.10	30.06	30.10	72	81	74	81	71	73	55	70	ne.	1-4	6	0.04
13	30.09	30.04	30.06	73	83	73	83	70	65	46	65	ne.	4	4	0.03
14	30.06	30.02	30.07	73	81	73	81	71	75	61	73	ene.	4	8	0.00
15	30.09	30.07	30.10	72	81	74	82	69	77	66	70	ne.	3	5	0.03
16	30.13	30.08	30.12	72	80	75	83	70	86	62	72	ene.	3	4	0.04
17	30.11	30.06	30.08	73	81	75	83	73	75	64	74	ne.	3	3	0.02
18	30.07	30.04	30.08	73	82	72	83	70	74	55	86	ene.	3	4	0.03
19	30.10	30.04	30.07	72	82	71	83	71	77	59	88	ne.	2	5	0.01
20	30.05	30.00	30.07	72	81	73	81	70	81	61	82	ne.	0-3-0	5	0.02
21	30.06	30.01	30.08	71	82	72	82	69	91	54	89	ne.	2	5	0.03
22	30.07	30.03	30.09	71	80	72	80	68	83	73	88	se.	1	6	0.04
23	30.09	30.01	30.05	72	79	74	79	68	83	75	83	s.	1	9	0.06
24	30.05	30.01	30.02	72	78	73	78	70	91	80	86	ne.	1	10	0.12
25	30.02	29.97	30.02	74	83	74	83	72	86	69	88	s.	2	9	0.06
26	30.04	29.98	30.05	73	79	74	80	72	95	83	93	s.	1	9	0.05
27	30.06	30.00	30.06	74	81	75	81	72	89	72	84	sw.	2-0	5	0.42
28	30.06	30.02	30.06	72	81	75	81	71	90	69	83	s.	2	5	0.01
29	30.08	30.04	30.08	73	83	72	83	72	86	67	82	se.	2-0	4	0.00
30	30.11	30.06	30.09	70	83	76	84	69	89	59	68	ne.	0-3	1	0.00
31	......	......	......	....	....	....	....	....	....	....	....	....	......	......	....
	30.08	30.03	30.08	72.0	81.0	73.4	81.5	70.0	80.8	62.8	77.9	ne.	2.3	5.7	1.44

Mean temperature: 6+2+9÷3 is 75.5°; extreme temperatures 84° and 68°.

Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

August, 1897.	Pressure at sea level. 6 a. m.	3 p. m.	9 p. m.	Temperature. 6 a. m.	2 p. m.	9 p. m.	Maximum.	Minimum.	Relative humidity. 6 a. m.	2 p. m.	9 p. m.	Wind. Direction.	Force.	Cloudiness.	Rain measured at 6 a. m.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%	%				*Ins.*
1	30.05	29.99	30.03	73	84	76	87	70	74	56	74	ne.	2	6	0.05
2	30.01	29.98	29.99	70	81	76	85	68	82	72	74	sw.	2	4	0.00
3	30.00	29.97	30.04	72	82	78	86	69	78	76	75	s.	2	8	0.00
4	30.01	29.97	30.02	73	83	77	88	72	82	69	83	ene.	2	7	0.01
5	30.03	30.01	30.07	74	81	79	84	74	62	68	68	nne.	3	6	0.02
6	30.09	30.06	30.11	74	81	78	86	73	74	68	67	ene.	4	8	0.02
7	30.11	30.07	30.11	73	81	75	84	73	78	61	78	ene.	5	6	0.02
8	30.09	30.02	30.08	73	81	77	83	72	74	61	67	ene.	4	7	0.02
9	30.06	30.01	30.07	73	82	77	86	73	71	65	67	ne.	4	3	0.00
10	30.06	30.02	30.10	74	81	76	85	74	78	61	70	ne.	3	5	0.00
11	30.09	30.04	30.11	75	81	76	86	73	71	61	70	ene.	4	4	0.01
12	30.07	30.04	30.08	73	82	77	86	71	74	69	83	ene.	4	5	0.06
13	30.08	30.05	30.09	74	83	77	86	73	75	73	83	ene.	3	10	0.10
14	30.08	30.05	30.07	75	83	78	86	75	91	63	75	ene.	3	5	0.19
15	30.08	30.05	30.08	75	81	77	85	75	67	61	63	ene.	4	6	0.00
16	30.07	30.03	30.05	74	81	76	85	74	70	65	70	ene.	3	5	0.01
17	30.05	30.02	30.09	72	81	77	84	69	70	61	63	ne.	2	6	0.00
18	30.10	30.04	30.11	74	83	78	85	74	60	63	67	ene.	2	6	0.03
19	30.18	30.01	30.08	75	81	77	86	73	74	68	67	ene.	3	3	0.05
20	30.07	30.02	30.07	76	80	76	85	76	70	64	70	ene.	5-4	5	0.00
21	30.06	30.02	30.05	73	80	76	84	72	70	57	66	ene.	3	6	0.03
22	30.05	29.99	30.05	75	82	73	85	74	70	58	82	ene.	3	4	0.01
23	30.04	30.01	30.07	74	81	77	86	72	59	54	67	ene.	3	3	0.02
24	30.08	30.04	30.11	75	82	77	86	75	67	62	71	ne.	1	3	0.00
25	30.08	30.02	30.07	76	83	78	86	74	71	59	67	ene.	2	5	0.09
26	30.02	29.99	30.07	73	81	77	85	72	82	61	74	ene.	3	8	0.11
27	30.02	29.98	30.06	76	82	77	86	74	71	65	74	ene.	2	8	0.05
28	30.07	30.02	30.08	75	83	79	86	74	91	62	68	ene.	2	3	0.01
29	30.07	30.04	30.10	74	83	77	86	72	71	55	71	ene.	3	6	0.09
30	30.11	30.08	30.08	72	81	77	85	69	82	61	67	ene.	3	4	0.15
31	30.09	30.00	30.05	76	81	76	85	73	70	61	70	ene.	3	3	0.08
	30.07	30.02	30.07	73.9	81.6	76.8	85.4	72.6	73.1	63.2	71.3	ene.	3.1	5.4	1.23

Mean temperature: 6+2+9÷3 is 77.4; extreme temperatures, 88° and 68°.

TABLE V.—*Mean temperature for each hour of seventy-fifth meridian time, August, 1897.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Bismarck, N Dak	60.3	58.9	57.8	56.8	55.8	55.1	54.1	55.6	58.4	62.2	66.1	69.5	71.5	73.5	75.6	76.9	77.5	77.1	76.5	74.7	71.0	66.1	63.4	61.5	65.7
Boston, Mass	65.4	64.8	64.3	63.7	63.4	63.2	65.0	67.2	69.2	71.2	72.3	73.6	74.5	74.8	75.0	74.6	73.5	72.7	70.7	69.1	68.3	67.4	66.7	66.0	69.0
Buffalo N Y	63.8	63.6	63.2	62.7	62.1	62.4	63.6	64.8	67.4	68.9	70.1	70.9	71.5	71.8	72.2	72.4	72.3	71.3	70.3	69.7	68.0	66.7	65.5	64.5	67.5
Chicago, Ill	68.0	67.1	66.2	65.4	64.9	64.1	64.2	65.7	67.5	69.0	69.7	70.9	71.4	71.8	72.5	72.9	72.6	73.0	72.1	70.7	70 4	69.7	69.0	68.5	69.0
Cincinnati, Ohio	70.2	68.8	68.1	66.8	66.0	65.0	64.6	66.5	69.0	72.5	75.5	78.1	79.5	80.3	80.7	81.2	81.6	81.1	79.5	77.8	76.5	74.4	73.0	71.4	73.7
Cleveland, Ohio	65.4	64.4	63.7	62.5	61.9	61.5	62.2	63.9	68.2	69.2	70.5	71.0	71.7	71.9	71.6	71.8	72.4	72.4	71.3	70.5	68.9	67.9	67.0	66.0	67.8
Detroit, Mich	64.0	63.3	62.5	61.9	61.1	60.7	61.3	63.6	66.3	68.1	70.0	71.5	72.4	73.0	73.4	73.5	74.0	72.7	71.3	69.7	68.0	66.9	65.6	65.0	67.5
Dodge City, Kans	70.1	69.2	68.3	67.0	65.9	65.3	64.6	65.1	68.4	73.2	76.9	80.6	83.1	84.7	86.1	87.1	86.0	85.5	84.0	81.3	77.5	74.8	72.7	71.4	75.4
Eastport, Me	55.6	55.5	54.8	54.6	54.8	55.3	56.7	58.9	60.9	62.4	63.9	64.7	64.7	65.4	65.7	65.0	64.2	62.7	60.1	58.7	58.0	57.7	56.9	56.3	59.7
Galveston, Tex	81.1	80.8	80.7	80.4	80.3	80.1	79.8	80.3	80.5	81.7	83.1	83.7	84.6	85.0	84.7	84.8	84.8	84.2	83.2	82.7	82.1	81.6	81.4	81.3	82.2
Havre, Mont	64.0	61.8	59.6	58.3	56.5	54.9	53.8	54.6	56.7	61.9	67.3	71.5	75.5	78.0	80.3	81.5	82.4	82.4	82.4	81.2	78.2	73.3	69.4	66.0	68.8
Kansas City, Mo	70.9	69.9	69.1	67.9	67.5	66.8	66.2	66.8	69.2	71.8	75.1	77.8	79.7	81.6	82.6	83.3	83.2	81.9	80.8	78.8	76.5	74.3	72.8	71.5	74.4
Key West, Fla	81.7	81.5	81.3	81.3	81.1	81.4	82.4	83.9	85.5	86.5	87.2	87.5	87.7	87.2	86.5	86.5	86.2	85.1	83.8	83.4	82.8	82.4	82.0	81.9	84.0
Memphis, Tenn	76.4	75.9	74.9	73.7	72.8	72.3	71.9	72.8	75.1	77.6	80.0	82.7	84.8	86.4	87.7	87.9	86.9	86.4	84.9	83.4	81.2	80.0	78.7	77.9	79.7
New Orleans, La	77.6	77.4	77.1	76.9	76.7	76.7	76.6	77.8	80.2	82.0	84.1	84.1	86.3	86.1	86.4	86.5	85.8	85.1	83.9	82.5	80.5	79.6	78.7	78.1	81.1
New York, N. Y	68.0	67.2	66.8	66.5	65.9	65.8	66.5	68.0	69.5	71.0	72.6	73.7	74.7	74.4	75.4	75.0	74.6	73.6	72.2	72.1	70.8	69.9	69.3	68.8	70.5
Philadelphia, Pa	69.9	69.1	68.6	68.0	67.2	67.1	68.7	70.6	72.8	75.2	77.4	78.6	79.8	80.7	81.4	81.1	80.5	78.8	76.4	74.6	73.2	71.9	71.1	70.4	73.9
Pittsburg, Pa	66.1	65.2	64.1	63.3	62.7	61.9	62.3	64.3	67.3	71.0	73.7	75.7	77.3	77.9	77.7	77.9	78.3	76.8	75.0	73.4	71.6	70.0	68.5	67.2	70.4
Portland, Oreg	71.2	69.7	68.1	66.6	64.8	63.7	62.1	61.5	60.3	61.0	63.2	65.5	68.1	70.5	73.7	76.0	78.8	80.5	81.5	81.3	80.3	78.2	75.1	72.7	70.6
St. Louis, Mo	73.3	72.0	70.8	69.9	68.8	68.0	67.9	69.5	72.0	74.9	77.6	80.0	82.0	83.4	84.3	85.1	85.5	84.2	82.4	80.8	78.9	77.5	75.8	74.4	76.6
St. Paul, Minn	62.4	61.5	60.5	59.6	59.1	58.6	58.1	59.2	61.8	64.4	67.1	69.1	71.0	72.3	73.4	74.3	74.1	73.1	72.0	70.5	68.0	66.2	64.5	63.3	66.0
Salt Lake City, Utah	72.7	72.2	71.0	69.3	68.8	67.1	66.5	65.9	67.5	70.3	74.4	78.8	82.2	84.2	85.3	84.7	84.8	85.4	85.4	84.3	82.3	78.9	76.0	74.3	76.3
San Diego, Cal	67.2	67.1	67.4	67.1	67.0	66.5	66.6	66.4	66.3	67.1	68.3	70.1	71.3	71.7	72.4	72.9	73.1	72.7	71.7	71.3	69.9	68.6	68.1	67.9	69.1
San Francisco, Cal	54.4	54.1	53.9	53.6	53.5	53.5	53.4	53.6	53.6	53.6	54.3	55.5	57.1	59.1	60.3	61.0	61.3	61.0	59.8	58.4	56.8	55.9	55.2	54.9	56.2
Savannah, Ga	75.8	75.3	74.6	74.1	73.8	73.5	74.2	76.9	79.3	82.8	85.2	86.4	87.0	87.6	87.5	86.0	83.9	81.4	80.0	78.7	77.4	77.2	76.8	76.4	79.7
Washington, D. C	68.0	67.5	66.7	66.0	65.4	64.9	66.5	70.1	73.2	76.0	77.9	79.3	80.5	81.5	81.7	81.9	81.3	79.9	76.3	74.0	71.8	70.3	69.3	68.5	73.3

TABLE VI.—*Mean pressure for each hour of seventy-fifth meridian time, August, 1897.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Bismarck, N. Dak	28.275	.282	.276	.278	.284	.286	.288	.294	.301	.303	.303	.300	.288	.277	.264	.252	.239	.233	.223	.220	.229	.249	.264	.269	.270
Boston, Mass	29.822	.819	.819	.822	.831	.843	.848	.848	.850	.847	.842	.834	.827	.817	.811	.809	.809	.813	.822	.828	.834	.835	.836	.834	.829
Buffalo, N. Y	29.160	.157	.157	.157	.162	.170	.177	.181	.185	.185	.179	.176	.170	.163	.155	.149	.145	.145	.147	.150	.158	.163	.163	.166	.163
Chicago, Ill.	29.127	.125	.125	.127	.134	.138	.147	.154	.153	.154	.154	.151	.142	.136	.123	.124	.115	.111	.109	.108	.121	.126	.129	.129	.132
Cincinnati, Ohio	29.345	.339	.336	.340	.335	.347	.358	.366	.370	.371	.370	.363	.352	.340	.333	.321	.315	.311	.314	.317	.326	.337	.340	.343	.341
Cleveland, Ohio	29.186	.186	.185	.183	.187	.193	.201	.207	.215	.215	.213	.210	.201	.192	.185	.179	.171	.166	.165	.164	.173	.178	.182	.184	.188
Detroit, Mich	29.218	.216	.214	.215	.223	.227	.236	.241	.243	.242	.239	.234	.225	.217	.203	.195	.192	.193	.196	.199	.214	.216	.216	.217	.218
Dodge City, Kans	27.460	.462	.461	.463	.461	.456	.461	.467	.476	.481	.483	.481	.471	.458	.447	.431	.419	.411	.410	.410	.419	.433	.447	.452	.451
Eastport, Me	29.857	.850	.847	.849	.854	.862	.869	.873	.876	.877	.875	.870	.863	.857	.849	.842	.846	.848	.854	.861	.865	.865	.865	.864	.860
Galveston, Tex	30.006	.000	.998	.994	.993	.998	.006	.012	.023	.033	.034	.031	.021	.014	.001	.987	.977	.971	.971	.970	.981	.994	.002	.003	.001
Havre, Mont	27.382	.385	.387	.388	.391	.395	.400	.407	.416	.418	.414	.409	.398	.386	.377	.368	.358	.349	.343	.341	.344	.356	.365	.370	.381
Kansas City, Mo	29.039	.036	.033	.032	.039	.044	.049	.051	.071	.078	.077	.072	.062	.049	.034	.021	.010	.003	.998	.991	.006	.021	.028	.031	.036
Key West, Fla	30.059	.046	.034	.030	.031	.038	.051	.060	.069	.071	.071	.063	.053	.041	.025	.011	.008	.018	.034	.046	.061	.068	.067	.064	.047
Memphis, Tenn	29.595	.590	.587	.585	.588	.594	.607	.618	.627	.634	.636	.633	.622	.611	.591	.575	.570	.562	.561	.566	.576	.586	.593	.595	.596
New Orleans, La	29.982	.975	.970	.972	.975	.985	.996	.003	.009	.009	.009	.003	.992	.980	.965	.955	.950	.948	.954	.960	.976	.984	.987	.985	.980
New York, N. Y	29.655	.649	.645	.645	.954	.662	.674	.676	.676	.675	.670	.663	.653	.645	.637	.634	.633	.633	.639	.647	.655	.661	.665	.664	.655
Philadelphia, Pa	29.868	.865	.861	.863	.867	.873	.881	.886	.892	.894	.891	.883	.874	.863	.853	.848	.847	.847	.855	.862	.870	.876	.877	.876	.870
Pittsburg, Pa	29.124	.121	.120	.119	.123	.132	.140	.146	.147	.149	.144	.135	.129	.116	.108	.100	.097	.098	.102	.113	.116	.118	.120	.123	.122
Portland, Oreg	29.795	.800	.810	.813	.815	.818	.820	.822	.827	.835	.842	.843	.838	.831	.815	.805	.785	.774	.750	.751	.748	.752	.765	.777	.802
St. Louis, Mo	29.422	.418	.419	.417	.423	.432	.445	.452	.456	.460	.456	.448	.435	.425	.408	.396	.387	.381	.382	.386	.399	.408	.417	.418	.420
St. Paul, Minn	29.099	.097	.094	.094	.097	.103	.113	.116	.116	.121	.123	.122	.115	.106	.098	.089	.086	.082	.078	.078	.087	.092	.093	.097	.100
Salt Lake City, Utah	25.678	.682	.684	.684	.686	.686	.694	.704	.714	.721	.727	.730	.723	.712	.698	.686	.675	.662	.654	.649	.652	.660	.668	.671	.687
San Diego, Cal	29.840	.841	.839	.830	.826	.823	.819	.823	.834	.842	.849	.854	.855	.853	.842	.834	.822	.810	.803	.797	.800	.807	.817	.829	.829
San Francisco, Cal	29.825	.827	.825	.824	.822	.819	.819	.825	.838	.845	.854	.862	.862	.856	.846	.836	.820	.807	.798	.792	.792	.801	.814	.820	.826
Savannah, Ga	29.957	.951	.946	.946	.952	.962	.969	.976	.984	.987	.982	.975	.963	.947	.933	.927	.926	.931	.943	.951	.964	.970	.966	.964	.957
Washington, D. C	29.884	.879	.876	.876	.881	.891	.900	.905	.908	.907	.905	.898	.889	.875	.865	.859	.856	.855	.860	.868	.880	.884	.885	.888	.882

TABLE VII.—*Average wind movement for each hour of seventy-fifth meridian time, August, 1897.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex	5.3	4.8	5.0	5.0	4.5	4.5	4.2	3.8	4.5	6.1	6.4	6.6	6.9	7.0	7.4	8.2	8.3	9.1	9.0	8.8	7.3	6.3	6.0	5.8	6.3
Albany, N. Y	4.5	4.4	4.5	4.0	4.2	4.2	4.8	6.0	7.1	7.8	8.5	9.0	9.1	9.3	9.0	9.6	9.8	8.2	5.2	4.6	4.5	4.2	4.5	4.6	6.3
Alpena, Mich	5.3	5.6	5.4	6.1	5.7	6.0	5.3	6.2	7.3	8.9	9.2	10.2	11.0	11.4	11.5	12.1	11.4	9.8	8.6	6.5	5.9	5.1	5.9	5.4	7.7
Amarillo, Tex	12.8	11.8	11.5	11.5	10.6	10.9	10.2	10.4	11.5	13.3	12.6	12.7	11.7	11.5	11.5	12.7	14.1	14.7	15.2	14.4	13.2	12.4	12.8	12.9	12.3
Atlanta, Ga	7.0	6.7	6.1	6.0	6.5	6.2	6.2	6.5	6.2	6.6	7.5	7.4	7.5	7.9	7.8	8.2	8.4	7.6	6.8	5.8	6.2	6.5	6.5	7.0	6.9
Atlantic City, N. J	7.5	7.0	7.3	6.7	6.3	6.3	7.2	8.3	8.8	8.8	9.5	9.8	10.8	11.1	11.3	11.3	10.9	10.3	8.6	7.8	7.5	7.3	7.4	7.0	8.5
Augusta, Ga	3.9	3.7	3.3	3.2	3.1	3.3	3.2	3.7	5.2	5.3	5.8	5.9	6.1	6.6	6.5	6.4	6.1	5.9	5.4	5.0	3.8	3.8	3.7	3.3	4.7
Baker City, Oreg	4.0	4.5	6.1	7.0	8.4	8.6	8.8	9.4	8.9	7.8	5.1	3.2	3.9	4.9	5.4	6.0	6.7	7.3	6.9	7.1	5.8	4.9	4.6	4.6	6.2
Baltimore, Md	2.4	2.7	2.7	2.9	3.2	2.6	3.0	3.5	3.9	4.7	5.2	5.5	5.8	5.8	6.1	5.9	5.4	5.2	4.2	3.4	2.7	2.6	2.2	2.4	3.9
Bismarck, N. Dak	6.1	6.3	6.7	5.9	5.5	5.3	5.5	6.2	6.7	7.6	8.6	9.8	10.4	11.2	11.1	11.6	11.1	10.6	9.9	9.5	8.5	7.8	7.0	6.4	8.1
Block Island, R. I	7.7	7.5	7.8	7.7	8.7	9.1	9.9	10.6	11.5	11.6	11.5	11.9	12.6	12.8	12.7	12.5	11.8	10.9	10.2	9.6	9.5	9.5	9.1	8.4	10.2
Boston, Mass	8.0	7.7	8.5	8.2	8.1	8.2	8.3	8.9	9.3	10.0	10.7	10.9	11.3	11.8	11.7	11.4	11.1	10.1	9.4	8.9	8.7	8.8	8.2	8.0	9.4
Buffalo, N. Y	9.5	9.5	9.5	9.1	9.2	9.3	8.5	9.1	10.5	11.5	11.6	13.0	14.1	14.8	15.3	14.9	13.9	13.6	12.8	12.9	11.6	11.4	11.0	10.3	11.5
Cairo, Ill	4.4	4.8	5.0	4.5	5.5	5.0	4.9	4.9	5.4	5.2	5.9	6.4	6.3	6.5	6.7	6.9	7.2	6.4	6.2	5.4	4.9	4.4	4.9	4.9	5.5
Cape Henry, Va	9.6	9.4	9.5	8.5	7.7	8.0	8.7	8.7	9.1	10.0	10.2	10.7	11.0	11.9	11.6	11.4	10.7	10.8	10.0	9.6	9.7	9.2	8.6	9.0	9.7
Carson City, Nev	5.4	4.6	4.5	3.6	3.1	3.5	3.5	3.8	3.7	2.5	2.4	3.1	3.4	3.8	5.5	6.9	10.2	12.5	13.4	13.0	11.8	10.3	7.4	5.9	6.2
Charleston, S. C	6.7	6.7	6.4	6.6	6.6	6.5	6.4	7.1	7.8	7.9	8.4	9.0	10.1	10.8	11.5	11.7	10.9	9.8	10.1	8.8	7.9	8.0	8.0	7.0	8.4
Charlotte, N. C	4.2	4.1	4.2	4.4	3.9	4.2	3.9	4.5	5.1	5.8	5.9	5.4	5.1	5.9	6.2	6.1	5.6	5.5	4.7	4.8	5.2	5.6	5.2	4.8	5.0
Chattanooga, Tenn	3.3	3.5	3.4	3.9	4.2	3.4	3.4	3.9	4.5	6.0	6.0	7.0	7.7	8.5	8.6	9.1	8.7	8.3	7.2	6.2	4.8	3.2	3.6	4.0	5.5
Cheyenne, Wyo	7.3	6.8	6.5	5.9	6.1	5.5	5.5	5.1	4.8	5.9	6.4	7.0	8.0	8.9	9.3	10.0	10.3	9.5	9.6	9.4	7.7	7.0	7.7	7.2	7.4
Chicago, Ill	13.7	14.1	13.5	13.5	13.5	14.3	15.3	14.9	14.2	15.0	16.0	15.7	16.1	16.1	17.3	18.0	17.2	17.4	16.6	15.0	13.8	13.6	13.6	13.2	15.1
Cincinnati, Ohio	3.3	3.5	3.6	3.5	3.1	3.0	3.7	4.1	5.0	5.7	6.7	8.0	8.6	8.8	9.5	9.2	9.3	8.7	7.9	6.0	4.9	4.5	4.5	3.6	5.8
Cleveland, Ohio	11.3	11.5	11.3	11.5	11.8	12.0	11.6	10.6	10.3	10.8	11.7	12.4	13.2	13.4	13.7	13.2	12.1	11.6	10.2	9.5	9.3	9.6	10.0	10.6	11.4
Columbia, Mo	5.3	4.7	4.9	5.1	5.1	5.0	4.5	5.4	5.7	6.6	7.0	7.5	7.8	8.0	8.1	7.8	8.3	7.6	6.0	5.3	5.4	5.2	5.5	5.0	6.1
Columbus, Ohio	4.4	4.0	4.1	3.6	3.7	3.9	4.1	4.6	5.4	5.8	6.8	7.2	8.0	8.2	8.5	8.2	8.4	7.5	6.6	5.7	5.2	4.9	4.9	4.7	5.8
Concordia, Kans	4.5	4.5	4.2	3.8	3.1	3.3	3.3	4.0	4.6	6.0	6.3	6.5	6.6	6.7	7.1	7.4	6.8	6.9	6.3	4.9	3.7	3.6	3.6	4.2	5.1
Corpus Christi, Tex	10.2	9.4	7.6	6.6	5.7	5.2	4.9	5.2	5.8	6.4	7.5	9.3	11.1	12.1	13.9	15.1	15.8	16.4	15.8	14.9	13.9	14.0	12.4	11.3	10.4
Davenport, Iowa	4.4	4.7	4.4	4.3	4.2	4.3	4.7	4.8	5.9	6.5	7.0	7.4	8.2	8.6	8.5	8.7	8.6	7.7	7.5	5.5	4.2	3.7	4.7	4.6	6.0
Denver, Colo	7.1	7.1	6.5	6.0	6.1	5.9	5.9	5.3	5.0	4.6	5.0	5.5	5.9	6.4	7.7	8.0	8.5	8.2	8.4	8.5	7.4	6.4	6.6	6.7	6.6
Des Moines, Iowa	4.3	4.3	4.7	5.2	4.7	4.7	4.6	4.6	5.2	6.6	7.7	8.0	8.4	8.3	8.7	8.4	8.7	8.3	7.4	6.0	5.5	5.1	5.2	4.8	6.2
Detroit, Mich	6.6	6.6	6.7	6.4	6.6	6.3	5.7	6.0	6.8	8.1	9.0	9.8	9.9	10.0	9.5	9.7	9.4	8.5	7.5	6.7	6.0	5.7	6.4	6.3	7.5
Dodge City, Kans	7.3	6.3	5.9	6.0	6.3	6.7	5.9	5.9	7.4	9.1	10.1	10.2	10.6	10.8	10.8	11.1	10.8	10.9	10.5	9.5	7.7	7.2	7.2	7.6	8.4
Dubuque, Iowa	4.3	4.1	4.2	4.1	4.3	4.6	4.6	5.2	5.9	6.2	7.0	7.8	8.1	8.1	8.4	8.8	7.9	7.5	6.7	5.6	5.2	4.5	4.1	4.2	5.9
Duluth, Minn	8.7	9.8	9.9	9.9	11.0	11.1	10.3	8.7	8.1	8.6	9.1	9.2	9.4	9.9	9.8	9.9	8.9	8.0	7.6	6.9	6.9	7.3	7.9	8.2	9.0
Eastport, Me	6.8	7.0	6.1	6.5	6.8	6.8	7.0	7.4	8.0	8.0	8.9	9.6	9.6	10.5	10.5	11.2	10.1	9.7	8.5	8.2	7.7	7.6	7.0	7.2	8.2
El Paso, Tex	8.0	8.6	9.0	7.8	7.5	7.4	7.2	7.1	6.6	7.3	8.0	7.8	7.6	7.6	7.9	7.8	8.2	8.9	9.5	9.3	8.8	7.3	7.1	7.2	7.9
Erie, Pa	7.5	7.7	7.7	8.1	8.6	8.8	8.3	8.4	8.4	9.0	9.5	9.1	9.7	10.3	10.3	10.3	9.7	9.1	7.7	7.8	8.2	8.1	7.8	8.1	8.7
Eureka, Cal	3.4	3.4	3.3	3.2	3.1	3.3	3.2	3.3	3.1	3.2	3.6	4.2	4.8	5.8	7.1	7.9	8.4	8.0	7.6	7.1	5.6	5.2	4.2	3.9	4.8
Fort Canby, Wash	13.3	12.9	12.6	12.2	11.6	11.7	11.2	11.2	9.9	9.8	9.4	9.5	9.9	10.4	10.9	11.9	13.8	14.2	13.9	14.9	15.6	15.9	15.7	14.9	12.4
Fort Smith, Ark	2.3	2.7	2.6	3.0	3.5	3.3	3.4	3.4	4.1	4.7	4.3	4.2	4.5	4.5	5.1	5.1	5.6	5.7	4.9	3.8	3.1	2.5	2.6	2.6	3.8
Fresno, Cal	8.9	8.9	8.6	8.0	7.1	6.2	5.8	5.1	4.4	4.2	4.1	3.9	4.4	4.3	4.3	4.8	5.3	5.6	6.1	6.5	6.6	6.9	7.7	8.2	6.1
Galveston, Tex	7.6	8.6	8.3	8.3	7.8	7.1	6.8	7.3	8.1	8.6	9.5	10.1	10.4	10.7	11.7	11.6	11.0	10.7	10.4	9.5	8.4	8.2	8.1	7.6	9.0
Grand Haven, Mich	5.6	6.1	5.8	5.8	5.8	6.0	5.5	6.1	7.3	8.0	9.2	10.2	10.9	12.0	12.4	12.3	11.7	9.9	7.7	6.5	6.5	6.1	6.0	6.1	7.9
Greenbay, Wis	5.3	5.4	5.0	5.7	5.3	5.6	5.3	5.7	6.8	7.4	8.0	8.0	8.5	8.7	8.6	8.2	8.5	7.8	7.6	6.0	5.5	5.5	5.6	5.6	6.7
Hannibal, Mo	6.0	5.7	5.5	5.2	5.4	5.1	5.2	5.0	6.3	7.0	7.7	8.6	8.8	8.5	8.9	8.8	8.0	7.3	6.4	5.0	4.0	4.8	5.0	5.9	6.4
Harrisburg, Pa	3.3	3.0	3.3	3.3	3.7	3.5	3.8	4.3	4.7	5.3	6.4	7.4	7.9	8.3	7.9	7.4	6.7	5.8	5.1	4.4	3.8	3.5	3.6	3.3	5.0
Hatteras, N. C	8.3	8.3	7.7	8.0	8.2	8.1	8.5	8.9	9.1	8.8	8.7	9.0	9.6	10.3	10.0	10.7	9.9	9.6	9.4	9.0	8.8	8.1	7.8	8.2	8.9
Havre, Mont	5.6	5.5	5.8	5.7	6.1	6.1	5.8	5.9	5.9	6.5	8.0	9.4	10.0	9.6	9.7	10.5	10.4	11.1	10.1	9.9	8.4	6.8	4.9	4.4	7.6
Helena, Mont	8.1	7.4	8.2	7.8	7.4	7.5	7.5	7.0	6.1	3.8	4.1	4.2	4.3	5.2	6.1	6.4	7.4	7.7	8.1	8.5	8.1	6.8	7.0	8.1	6.8
Huron, S. Dak	8.6	8.6	9.0	8.5	8.3	8.9	8.4	7.9	8.7	10.7	11.9	12.1	12.8	13.9	13.7	13.7	12.8	12.5	11.5	10.2	8.8	9.2	9.4	9.5	10.4
Idaho Falls, Idaho	8.3	8.5	8.3	8.1	8.3	7.8	6.6	6.1	6.2	6.2	7.4	8.0	9.2	10.4	10.9	10.8	12.0	12.1	12.7	13.5	11.6	10.2	10.3	8.6	9.3
Indianapolis, Ind	5.7	5.0	5.1	4.9	4.8	5.2	5.3	5.6	7.0	7.8	8.5	8.9	9.9	10.9	10.8	10.5	9.8	9.6	8.5	6.8	6.3	6.7	7.3	6.4	7.4
Jacksonville, Fla	6.2	5.5	5.2	4.5	4.7	4.8	5.2	5.0	5.8	5.8	6.3	6.7	7.5	7.4	7.6	8.4	9.1	8.4	7.8	6.1	6.0	6.9	5.8	5.6	6.3
Jupiter, Fla	5.3	4.7	4.5	4.8	4.9	4.3	4.3	5.2	6.9	8.4	9.2	9.7	9.9	10.0	9.5	10.3	9.1	8.5	7.6	7.2	6.4	6.0	5.4	5.6	7.0
Kansas City, Mo	5.9	6.0	5.6	5.7	5.3	4.8	5.1	5.3	5.7	6.3	7.3	7.8	8.4	8.3	8.8	9.1	8.9	8.4	7.1	6.0	5.3	5.3	5.3	5.3	6.5
Keokuk, Iowa	4.5	4.7	4.5	4.5	4.9	4.6	4.3	4.7	5.5	5.9	6.7	7.4	7.8	7.7	7.7	7.8	7.8	7.2	5.9	4.5	4.4	4.0	4.5	5.0	5.7
Key West, Fla	6.2	6.0	5.5	4.7	5.3	5.1	5.1	5.8	7.1	7.5	7.4	7.5	7.9	8.0	8.8	8.4	7.8	7.9	7.4	7.1	6.5	6.1	6.5	6.8	6.8
Kittyhawk, N. C	9.8	9.3	9.3	8.8	9.0	8.6	9.1	9.8	10.1	10.3	11.0	9.7	11.4	12.2	12.4	13.2	13.2	13.2	12.4	12.2	11.5	11.9	11.5	10.2	10.8
Knoxville, Tenn	3.7	3.9	3.7	3.2	3.6	3.2	2.9	3.2	4.2	4.7	5.5	5.9	6.4	6.5	6.8	6.7	6.6	7.0	5.7	5.2	4.2	4.3	4.4	3.7	4.8
La Crosse, Wis	3.8	4.2	4.5	4.4	4.5	4.6	4.4	4.3	4.7	5.1	6.1	7.7	7.5	7.2	7.9	7.4	7.2	6.6	6.1	5.4	4.7	4.2	4.2	3.7	5.4
Lander, Wyo	4.8	4.6	3.8	3.4	3.1	3.1	3.0	2.6	1.9	1.9	2.9	3.2	3.5	4.0	5.2	5.8	7.3	6.7	6.3	6.5	6.0	5.4	5.5	5.3	4.4
Lexington, Ky	7.3	7.1	7.2	6.9	6.6	6.5	6.5	6.0	6.6	6.9	7.4	7.9	8.6	8.6	8.9	8.7	9.1	9.6	7.6	7.1	7.0	7.4	7.6	7.4	7.5
Little Rock, Ark	3.0	2.4	3.1	3.0	3.0	3.6	3.6	3.8	4.7	5.5	5.5	5.8	6.8	6.3	6.8	6.5	6.6	6.8	7.1	4.9	3.6	3.5	2.8	2.8	4.6
Los Angeles, Cal	2.7	2.2	2.0	1.9	1.7	1.5	1.5	1.5	1.9	1.8	2.6	3.2	4.1	4.8	6.2	7.8	9.1	9.1	8.6	8.0	7.2	5.7	4.4	3.1	4.3
Louisville, Ky	4.3	4.3	4.3	4.4	5.0	5.1	4.9	4.9	5.4	5.7	6.8	7.8	8.9	9.1	9.8	10.4	9.8	9.0	8.1	6.8	6.4	5.8	5.8	4.6	6.5
Lynchburg, Va	1.5	1.6	1.3	1.5	1.5	1.3	1.6	2.3	3.4	4.4	5.1	5.0	5.4	5.7	5.9	5.9	5.7	4.9	4.0	2.9	2.3	2.2	1.6	2.1	3.3
Marquette, Mich	8.6	8.9	9.3	9.8	9.6	9.3	7.5	7.7	8.6	10.1	11.5	12.2	12.0	12.0	11.6	11.2	10.4	9.3	6.8	6.1	5.6	6.5	7.5	8.2	9.2
Memphis, Tenn	6.1	5.7	5.7	5.9	5.3	5.7	6.0	5.6	5.9	6.2	6.6	6.8	7.1	7.2	7.5	7.6	7.7	7.9	6.3	5.4	4.9	5.1	5.4	5.5	6.2
Milwaukee, Wis	6.4	7.2	7.1	6.8	6.5	6.7	7.6	8.2	8.7	9.5	10.1	9.9	11.4	11.3	11.9	11.8	11.5	10.2	9.2	7.6	6.5	6.6	6.6	6.2	8.6
Mobile, Ala	3.9	3.8	3.5	3.4	3.8	3.4	3.9	4.2	4.5	4.7	5.3	5.9	7.0	7.1	7.3	8.5	8.6	8.7	7.8	6.6	5.1	4.7	4.6	3.8	5.4
Montgomery, Ala	4.3	4.5	4.0	3.5	3.9	3.6	3.6	3.5	4.4	5.1	5.8	5.8	6.4	7.1	6.7	7.1	6.5	6.2	5.7	5.5	4.9	5.1	4.5	4.0	5.1
Moorhead, Minn	7.9	7.3	6.9	6.2	5.8	6.0	6.2	6.5	7.3	7.9	9.1	9.5	10.2	10.0	9.9	10.1	9.7	9.3	8.9	7.3	6.6	7.1	7.5	8.1	8.0
Nantucket, Mass	6.2	6.6	6.6	6.8	6.6	6.6	7.8	8.3	9.2	10.2	10.7	10.4	10.5	10.4	9.7	9.9	9.2	7.9	6.9	6.5	6.5	6.4	6.3	6.4	8.0
Nashville, Tenn	3.4	3.0	2.7	3.0	2.5	2.8	2.9	3.4	4.6	5.5	5.6	6.2	6.5	6.9	7.0	7.6	7.1	7.8	7.0	5.9	4.9	4.4	3.8	3.4	4.9
New Haven, Conn	5.2	5.5	5.8	5.8	5.7	5.7	4.9	6.0	7.6	8.6	9.0	9.0	10.2	10.2	10.6	10.2	9.4	7.8	6.8	6.1	6.1	5.7	5.2	5.1	7.2
New Orleans, La	5.5	5.1	4.8	4.9	4.4	4.6	5.4	5.6	6.1	7.3	7.7	7.5	9.2	8.9	9.0	9.5	9.9	9.3	8.3	7.4	6.8	6.5	6.3	5.5	6.9
New York, N. Y	7.8	8.3	8.2	7.3	8.1	7.5	7.0	7.8	8.4	8.9	9.0	9.8	10.7	11.6	11.9	12.0	12.8	12.6	12.1	11.3	10.8	10.1	9.5	8.5	9.7
Norfolk, Va	6.5	6.5	5.9	5.7	5.2	4.8	5.5	6.2	6.6	7.0	7.4	7.4	7.9	7.8	7.9	8.1	8.7	8.3	7.5	6.8	6.8	6.4	6.5	6.4	6.8
Northfield, Vt	6.2	5.8	5.4	5.2	5.1	4.4	4.5	5.6	7.4	8.6	10.0	10.3	9.9	10.6	10.7	10.6	9.2	8.0	5.5	5.8	6.5	6.4	6.5	6.5	7.3
North Platte, Nebr	6.7	6.3	6.0	6.2	5.6	5.4	5.1	4.9	5.2	6.3	7.2	7.3	8.3	9.0	9.7	9.8	9.8	10.1	9.5	8.1	7.9	6.9	7.5	7.1	7.3
Oklahoma, Okla	6.0	5.9	5.6	5.7	5.7	6.0	6.0	6.1	6.5	8.5	9.4	10.2	10.0	10.1	9.9	9.8	9.8	9.9	9.6	7.8	5.9	5.9	6.4	6.5	7.6
Omaha, Nebr	5.6	5.6	4.9	5.3	5.2	4.9	4.3	4.8	5.6	6.9	7.7	8.6	9.3	9.0	9.7	9.5	9.0	9.0	8.5	7.0	5.4	5.4	5.6	5.9	6.8
Oswego, N. Y	7.9	7.2	7.3	7.4	8.0	7.8	7.9	7.7	8.3	8.6	9.3	9.4	10.1	10.1	9.8	9.3	8.8	7.4	6.9	6.4	6.6	7.2	7.5	7.6	8.1
Palestine, Tex	4.0	3.7	3.6	3.5	3.6	3.1	3.1	3.4	4.4	5.7	5.9	6.2	6.5	6.4	7.3	7.5	7.3	6.8	6.6	5.2	3.7	3.9	4.3	4.3	5.0
Parkersburg, W. Va	3.0	3.3	3.2	3.0	3.1	2.7	3.2	3.7	4.3	4.5	5.2	5.4	5.9	6.1	6.6	6.8	6.6	5.5	4.5	3.9	3.2	2.9	3.2	3.3	4.3

TABLE VII.—*Average wind movement, etc.*—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Pensacola, Fla	5.6	5.3	6.1	5.9	6.0	6.2	6.5	6.9	7.2	7.3	7.7	7.9	8.6	9.8	10.9	10.5	10.7	9.9	9.0	6.9	5.4	4.9	5.3	5.1	7.3
Philadelphia, Pa	5.4	5.1	4.8	5.3	5.3	5.6	6.3	7.1	8.0	8.6	9.3	8.9	9.8	10.7	11.0	10.7	10.4	9.5	8.6	7.5	6.8	6.4	5.8	5.5	7.6
Phœnix, Ariz	4.2	4.0	3.9	4.1	4.2	3.7	3.5	3.5	3.2	3.4	3.9	4.4	4.2	5.0	4.5	4.3	4.5	4.0	4.2	4.6	4.7	5.4	5.5	4.7	4.2
Pierre, S. Dak	6.6	5.1	5.0	5.4	6.1	6.4	6.5	6.5	6.8	7.7	8.6	9.1	10.3	9.9	9.4	9.8	9.1	9.0	9.1	8.8	8.3	8.1	7.9	7.7	7.8
Pittsburg, Pa	3.1	3.2	3.2	3.4	2.9	3.4	3.3	3.6	4.2	5.3	5.8	6.0	6.2	7.0	6.6	6.8	6.8	6.9	5.6	4.8	4.1	3.5	3.4	3.3	4.7
Port Angeles, Wash	4.4	4.3	4.5	4.3	4.1	4.2	4.0	4.7	4.3	3.3	2.5	3.8	4.5	5.2	5.7	6.8	7.0	7.5	7.5	8.4	7.9	6.3	5.0	4.4	5.2
Port Huron, Mich	8.0	7.9	7.8	7.5	7.8	7.9	7.6	7.0	7.6	8.6	8.9	9.9	10.9	11.0	10.6	10.5	10.2	9.0	7.7	7.5	7.5	7.5	7.5	8.0	8.5
Portland, Me	4.9	5.1	5.1	4.9	4.9	4.8	5.3	5.6	5.9	6.8	7.6	8.3	9.1	9.5	9.3	9.1	8.6	7.5	6.3	5.5	5.7	5.7	5.2	5.2	6.5
Portland, Oreg	11.1	9.8	8.3	8.1	8.0	7.4	6.3	6.2	5.9	6.0	7.0	7.2	8.8	9.1	9.1	10.1	11.0	11.5	12.0	11.6	12.1	11.8	12.8	11.9	9.3
Pueblo, Colo	5.0	4.7	4.9	3.3	3.6	3.7	3.5	3.2	3.5	4.3	4.7	5.2	6.0	7.2	7.6	8.4	8.9	9.6	10.5	9.5	8.3	7.1	7.2	5.9	6.1
Raleigh, N. C	4.2	4.4	3.8	3.9	3.8	3.6	3.5	4.6	5.1	5.4	5.5	5.4	5.8	6.0	6.1	6.2	5.9	5.4	4.6	4.2	3.8	4.1	4.5	4.7	4.8
Rapid City, S. Dak	6.9	6.7	6.8	7.1	7.5	6.9	7.1	6.8	7.1	6.9	7.7	8.7	9.2	9.6	9.4	9.1	9.0	9.1	9.0	8.8	6.0	6.1	6.2	6.9	7.7
Redbluff, Cal	3.9	4.3	3.6	3.6	3.6	3.3	3.2	3.1	3.2	2.7	3.1	3.2	3.7	3.7	4.0	4.7	5.4	6.4	6.3	6.4	6.2	5.5	5.0	4.5	4.3
Rochester, N. Y	5.5	5.3	5.3	5.8	5.5	5.6	5.7	6.4	6.8	7.0	7.2	7.7	8.2	8.5	8.6	8.9	8.2	7.2	5.8	4.9	4.5	5.0	5.0	5.5	6.4
Roseburg, Oreg	2.6	2.0	1.6	1.5	1.5	1.5	1.4	1.4	1.5	1.2	1.5	2.2	3.0	3.5	4.4	4.9	5.7	6.8	7.9	8.6	8.6	7.2	4.8	3.1	3.7
Sacramento, Cal	9.7	9.1	9.8	10.0	9.7	9.6	9.5	8.4	7.8	7.2	6.6	7.5	6.8	7.1	7.3	8.0	8.6	8.5	9.5	10.3	10.1	10.3	10.5	10.1	8.8
St. Louis, Mo	6.5	6.6	7.0	7.0	6.9	6.3	6.5	7.3	7.5	7.8	8.4	8.6	9.2	9.5	9.5	9.1	9.8	10.1	9.1	8.0	7.3	7.2	7.2	6.9	7.9
St. Paul, Minn	3.9	4.0	3.9	4.5	4.6	5.1	5.0	5.5	6.6	6.8	7.7	8.6	9.0	9.6	8.9	9.1	9.3	8.9	7.8	6.6	5.0	4.6	4.7	4.1	6.4
Salt Lake City, Utah	5.6	4.5	4.8	4.5	4.1	4.0	3.9	4.0	4.1	3.5	3.5	3.9	4.9	6.3	6.9	8.3	9.1	8.7	8.5	8.9	7.6	6.0	5.7	5.4	5.7
San Antonio, Tex	6.9	5.8	5.2	4.5	4.1	4.2	4.1	3.5	4.5	5.6	6.1	5.9	6.4	7.7	8.6	10.0	10.5	11.0	11.0	11.0	9.9	9.0	8.5	7.5	7.2
San Diego, Cal	3.3	2.4	2.9	2.5	2.7	3.1	3.0	2.7	3.1	3.2	3.6	5.1	7.2	9.1	10.4	10.7	10.8	10.5	10.3	8.7	7.6	6.2	4.5	3.1	5.7
Sandusky, Ohio	6.2	6.5	6.4	6.1	6.0	6.0	5.8	6.1	7.1	7.6	8.2	8.7	9.2	9.8	9.7	9.5	9.8	8.4	7.6	6.8	5.9	6.5	7.0	6.5	7.4
San Francisco, Cal	13.4	12.9	12.0	11.3	10.1	8.9	8.3	8.1	7.4	7.3	8.3	9.0	10.1	12.3	15.4	18.1	20.8	22.6	23.7	23.2	22.5	20.0	18.1	15.9	14.1
San Luis Obispo, Cal	2.9	2.5	2.2	2.5	2.6	2.7	3.1	3.0	3.2	3.1	3.1	3.1	3.7	4.7	5.5	6.8	7.1	7.0	6.8	6.5	5.6	4.8	4.0	3.3	4.2
Santa Fe, N. Mex	7.5	6.7	5.1	4.3	3.4	3.1	3.1	3.0	2.5	2.5	4.4	5.1	5.9	6.3	7.5	8.6	8.2	8.0	6.9	7.4	7.2	7.4	7.8	7.5	5.8
Sault Ste Marie, Mich	4.9	4.8	4.5	4.8	4.5	4.5	4.8	5.2	6.5	7.7	9.1	10.3	11.9	13.1	12.8	13.6	13.4	12.1	10.8	8.8	6.7	6.6	5.9	5.6	8.1
Savannah, Ga	4.9	5.3	4.7	4.6	4.5	4.5	4.5	5.0	5.6	5.7	6.5	6.0	6.3	7.1	7.3	7.6	8.3	8.5	7.3	7.1	6.4	5.7	5.5	5.6	6.0
Seattle, Wash	2.4	2.5	3.1	3.0	2.7	2.9	2.5	2.8	2.8	2.7	2.8	3.7	4.0	5.3	6.0	6.7	6.8	7.5	7.7	6.9	6.1	4.5	3.4	3.3	4.2
Shreveport, La	4.7	4.4	3.8	3.1	3.3	3.0	3.0	3.3	4.4	5.5	5.7	5.7	5.9	6.3	6.2	6.7	6.4	6.7	5.6	4.2	4.0	4.8	5.2	5.1	4.9
Sioux City, Iowa	9.6	9.4	9.2	9.0	8.6	7.8	9.2	8.8	9.3	10.6	11.6	11.9	13.2	13.4	13.3	13.0	12.7	12.7	12.2	11.3	10.2	10.4	11.4	10.9	10.8
Spokane, Wash	2.6	3.0	2.6	2.3	2.5	2.8	2.1	2.2	2.4	3.1	4.2	4.5	5.3	5.8	5.5	6.5	6.8	6.7	6.5	7.1	6.8	5.5	3.7	2.6	4.3
Springfield, Ill	6.2	6.2	6.4	6.4	6.4	6.2	6.1	6.0	6.9	7.6	7.8	8.5	8.6	9.1	9.1	8.8	8.5	7.7	6.7	5.3	5.7	5.5	6.0	6.1	7.0
Springfield, Mo	6.4	6.0	6.0	6.3	6.1	5.7	5.5	5.0	5.3	7.0	8.9	8.9	8.7	8.6	8.6	8.8	9.2	8.6	7.9	6.7	6.5	6.8	6.5	6.3	7.1
Tacoma, Wash	4.1	3.6	3.2	2.7	2.6	2.2	2.2	2.2	2.5	2.7	2.9	4.4	5.4	6.7	7.3	8.0	7.4	7.2	6.8	7.0	7.1	6.2	6.4	5.6	4.8
Tampa, Fla	4.1	3.8	3.4	3.7	3.8	3.4	3.5	4.4	5.5	6.1	6.9	6.7	7.5	7.5	7.8	7.6	7.5	5.9	5.1	4.9	4.3	3.6	3.5	3.0	5.1
Tatoosh Island, Wash	8.8	9.2	8.7	9.0	9.1	9.0	9.0	8.0	8.4	8.8	10.1	10.7	10.3	10.4	10.5	10.7	10.8	10.1	10.1	9.6	9.5	9.1	9.4	9.0	9.5
Toledo, Ohio	6.3	6.3	6.2	6.4	6.6	6.5	6.4	6.5	7.2	8.1	8.5	9.9	11.0	10.8	10.6	10.0	10.0	9.9	8.2	6.9	6.8	6.4	6.5	6.6	7.8
Vicksburg, Miss	3.9	4.5	5.0	4.2	3.9	3.9	4.0	3.7	3.5	4.5	5.0	5.3	5.4	5.9	6.4	6.4	6.7	6.2	5.0	3.5	4.2	4.4	4.2	4.5	4.8
Vineyard Haven, Mass	5.1	5.1	5.3	5.1	5.2	5.3	6.5	7.5	7.9	8.0	8.3	8.7	8.6	8.8	8.6	8.5	8.2	7.6	6.4	6.0	5.5	5.6	5.7	5.6	6.8
Walla Walla, Wash	5.0	4.5	4.2	4.3	4.4	4.7	4.5	4.3	4.5	3.9	3.9	4.8	4.9	5.0	4.5	4.7	4.8	4.6	4.7	5.2	5.2	4.9	5.3	6.4	4.7
Washington, D. C	2.8	2.9	2.5	2.8	3.2	2.5	2.7	3.8	5.3	6.1	6.7	7.1	7.5	6.8	7.2	7.0	6.3	5.7	4.9	3.6	3.6	3.4	3.1	3.1	4.6
Wichita, Kans	4.8	5.2	4.5	4.3	4.3	4.3	4.5	4.0	5.1	6.0	6.8	7.4	8.0	7.9	8.5	8.2	8.4	7.7	7.0	6.3	5.7	5.3	5.5	5.3	6.0
Williston, N. Dak	5.7	5.5	4.9	5.5	4.7	4.5	4.1	4.1	4.9	6.2	7.2	7.5	8.5	10.0	9.9	10.4	10.4	10.6	11.1	11.0	10.5	8.1	6.6	6.1	7.4
Wilmington, N. C	4.5	4.8	4.6	4.5	4.9	4.7	4.6	5.5	6.4	6.9	7.1	7.2	8.1	8.7	8.8	8.5	8.5	7.9	7.2	6.2	6.1	5.4	5.0	4.6	6.3
Woods Hole, Mass	10.6	10.8	11.2	10.4	10.3	10.5	11.0	11.2	11.9	11.2	11.2	11.6	13.1	12.9	13.1	13.5	14.0	13.4	11.8	11.1	10.3	11.0	11.1	10.6	11.6
Yankton, S. Dak	5.4	5.1	4.7	5.0	5.2	5.5	5.1	5.6	6.5	7.3	8.4	9.7	9.8	9.8	9.8	9.6	9.5	9.5	8.6	7.6	6.4	6.1	5.7	5.6	7.1

TABLE VIII.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of August, 1897.*

Stations.	Component direction from— N.	S.	E.	W.	Resultant. Direction from—	Duration.
	Hours.	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
New England.						
Eastport, Me	13	26	6	26	s. 57 w.	24
Portland, Me	14	22	8	33	s. 72 w.	26
Northfield, Vt	18	35	6	10	s. 13 w.	18
Boston, Mass	13	18	11	30	s. 75 w.	19
Nantucket, Mass	12	26	9	32	s. 59 w.	27
Woods Hole, Mass.*	4	20	3	10	s. 24 w.	18
Block Island, R. I	13	22	14	32	s. 63 w.	20
New Haven, Conn	27	20	9	19	n. 55 w.	12
Middle Atlantic States.						
Albany, N. Y	21	30	4	15	s. 51 w.	14
Binghamton, N. Y†	13	4	12	9	n. 18 e	10
New York, N. Y	14	23	14	23	s. 45 w.	13
Harrisburg, Pa	20	15	17	22	n. 45 w.	7
Philadelphia, Pa	20	20	15	21	w.	7
Atlantic City, N. J	17	26	11	25	s. 57 w.	14
Baltimore, Md	22	16	21	19	n. 18 e.	6
Washington, D. C	25	20	14	14	n.	5
Lynchburg, Va	14	20	12	28	s. 69 w.	17
Norfolk, Va	15	24	23	19	s. 24 e.	10
South Atlantic States.						
Charlotte, N. C	14	30	24	9	s. 43 e.	22
Hatteras, N. C	12	22	16	27	s. 43 w.	16
Kittyhawk, N. C.	14	23	22	22	s.	9
Raleigh, N. C	15	24	11	23	s. 53 w.	15
Wilmington, N. C	9	24	11	30	s. 52 w.	24
Charleston, S. C	7	26	12	29	s. 42 w.	26
Augusta, Ga	18	16	13	27	n. 82 w.	14
Savannah, Ga	8	28	7	26	s. 44 w.	28
Jacksonville, Fla	8	23	16	24	s. 28 w.	17
Florida Peninsula.						
Jupiter, Fla	4	38	17	17	s.	34
Key West, Fla	9	22	37	6	s. 67 e.	34
Tampa, Fla	11	23	24	20	s. 14 e.	12
Eastern Gulf States.						
Atlanta, Ga	10	16	15	30	s. 68 w.	16
Pensacola, Fla	27	17	12	29	n. 60 w.	20
Mobile, Ala	23	23	7	17	w.	10
Montgomery, Ala	15	29	12	20	s. 30 w.	16
Vicksburg, Miss	21	21	13	21	w.	8
New Orleans, La	8	33	15	20	s. 11 w.	26
Western Gulf States.						
Shreveport, La	9	39	17	11	s. 11 e.	31
Fort Smith, Ark	19	12	29	13	n. 66 e.	18
Little Rock, Ark	22	19	12	24	n. 76 w.	12
Corpus Christi, Tex	14	30	25	6	s. 50 e.	25
Galveston, Tex	8	29	17	19	s. 5 w.	21
Palestine, Tex	17	29	20	6	s. 49 e.	18
San Antonio, Tex	16	19	30	8	s. 82 e.	22
Ohio Valley and Tennessee.						
Chattanooga, Tenn	16	27	11	23	s. 47 w.	16
Knoxville, Tenn	18	25	9	22	s. 62 w.	15
Memphis, Tenn	23	14	16	18	n. 13 w.	9
Nashville, Tenn	17	23	10	24	s. 67 w.	15
Lexington, Ky	16	26	12	26	s. 54 w.	17
Louisville, Ky	22	18	21	11	n. 68 e.	11
Indianapolis, Ind	33	12	13	19	n. 16 w.	22
Cincinnati, Ohio	22	18	22	17	n. 51 e.	6
Columbus, Ohio	18	21	20	19	s. 18 e.	3
Pittsburg, Pa	30	10	14	21	n. 19 w.	21
Parkersburg, W. Va	19	22	17	20	s. 45 w.	4
Lower Lake Region.						
Buffalo, N. Y	17	16	9	34	n. 88 w.	25
Oswego, N. Y	12	28	12	23	s. 34 w.	19
Rochester, N. Y	15	23	10	32	s. 70 w.	23
Erie, Pa	15	26	10	22	s. 47 w.	16
Cleveland, Ohio	18	27	18	12	s. 34 e.	11
Sandusky, Ohio	18	17	21	19	n. 63 e.	2
Toledo, Ohio	19	14	18	20	n. 22 w.	5
Detroit, Mich	20	14	14	26	n. 63 w.	13
Upper Lake Region.						
Alpena, Mich	22	15	11	31	n. 71 w.	21
Grand Haven, Mich	23	16	18	22	n. 30 w.	8
Marquette, Mich	19	15	8	22	n. 74 w.	15
Port Huron, Mich	21	23	12	19	s. 74 w.	7
Sault Ste. Marie, Mich	25	12	22	23	n. 4 w.	13
Chicago, Ill	26	15	16	18	n. 80 w.	11
Milwaukee, Wis	25	14	15	23	n. 36 w.	14
Upper Lake Region—Cont'd.						
Greenbay, Wis	22	21	9	25	n. 87 w.	16
Duluth, Minn	31	11	14	22	n. 22 w.	22
North Dakota.						
Moorhead, Minn	25	17	17	23	n. 37 w.	10
Bismarck, N. Dak	23	15	20	14	n. 37 e.	10
Williston, N. Dak	27	23	14	9	n. 51 e.	6
Upper Mississippi Valley.						
St. Paul, Minn	22	20	10	23	n. 81 w.	13
La Crosse, Wis. †	8	17	5	7	s. 13 w.	9
Davenport, Iowa	21	9	17	26	n. 37 w.	15
Des Moines, Iowa	25	17	18	16	n. 14 e.	8
Dubuque, Iowa	22	14	14	29	n. 62 w.	17
Keokuk, Iowa	27	14	8	30	n. 60 w.	26
Cairo, Ill	22	24	14	17	s. 56 w.	4
Springfield, Ill	23	12	18	23	n. 24 w.	12
Hannibal, Mo. †	7	11	6	12	s. 56 w.	7
St. Louis, Mo	29	15	16	16	n.	14
Missouri Valley.						
Columbia, Mo.*	15	3	10	9	n. 5 e.	12
Kansas City, Mo	27	18	17	11	n. 34 e	11
Springfield, Mo	19	26	15	16	s. 8 w.	7
Lincoln, Nebr	20	23	27	11	s. 79 e.	16
Omaha, Nebr	28	19	14	13	n. 6 e.	9
Sioux City, Iowa†	12	7	10	8	n. 22 e.	5
Pierre, S. Dak	14	17	37	9	s. 84 e.	28
Huron, S. Dak	27	18	25	9	n. 61 e.	18
Yankton, S. Dak	22	15	21	14	n. 45 e.	10
Northern Slope.						
Havre, Mont	28	6	18	23	n. 23 w.	13
Miles City, Mont	25	14	15	14	n. 5 e.	11
Helena, Mont	19	23	1	31	s. 82 w.	30
Rapid City, S. Dak	19	13	17	30	n. 65 w.	14
Cheyenne, Wyo	22	19	9	24	n. 79 w.	15
Lander, Wyo	13	25	17	25	s. 34 w.	14
North Platte, Nebr	15	24	14	22	s. 42 w.	12
Middle Slope.						
Denver, Colo	20	23	10	19	s. 72 w.	10
Pueblo, Colo	23	10	20	19	n. 4 e.	13
Concordia, Kans	14	24	25	11	s. 54 e.	17
Dodge City, Kans	12	34	18	11	s. 18 e.	23
Wichita, Kans	14	33	21	4	s. 42 e.	26
Oklahoma, Okla	14	30	20	6	s. 41 e.	21
Southern Slope.						
Abilene, Tex	4	36	29	6	s. 36 e.	39
Amarillo, Tex	5	40	12	11	s. 2 e.	35
Southern Plateau.						
El Paso, Tex	14	11	41	9	n. 83 e.	32
Santa Fe, N. Mex	10	26	32	10	s. 54 e.	27
Phœnix, Ariz	17	11	28	18	n. 59 e.	12
Yuma, Ariz	11	25	15	24	s. 33 w.	17
Middle Plateau.						
Carson City, Nev	12	23	3	35	s. 71 w.	34
Winnemucca, Nev	14	21	18	25	s. 45 w.	10
Salt Lake City, Utah	15	24	25	16	s. 45 e.	13
Northern Plateau.						
Baker City, Oreg	23	31	2	13	s. 54 w.	14
Idaho Falls, Idaho	29	18	11	12	n. 5 w.	11
Spokane, Wash	23	16	16	19	n. 23 w.	8
Walla Walla, Wash	17	23	10	20	s. 59 w.	12
North Pacific Coast Region.						
Fort Canby, Wash	38	20	3	6	n. 9 w.	18
Port Angeles, Wash.*	13	0	10	16	n. 25 w.	14
Seattle, Wash	32	15	11	17	n. 19 w.	18
Tacoma, Wash.	40	11	6	14	n. 15 w.	30
Tatoosh Island, Wash	8	35	13	11	s. 4 e.	27
Portland, Oreg	31	16	10	28	n. 50 w.	23
Roseburg, Oreg	33	6	16	22	n. 13 w.	28
Middle Pacific Coast Region.						
Eureka, Cal	19	25	8	31	s. 75 w.	24
Redbluff, Cal	15	31	23	10	s. 36 e.	22
Sacramento, Cal	7	43	3	27	s. 34 w.	43
San Francisco, Cal	0	16	0	55	s. 75 w.	58
South Pacific Coast Region.						
Fresno, Cal	34	3	1	45	n. 55 w.	54
Los Angeles, Cal	12	9	9	40	n. 84 w.	31
San Diego, Cal	30	12	2	35	n. 61 w.	38
San Luis Obispo, Cal	24	15	1	27	n. 71 w.	28

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IX.—*Thunderstorms and auroras, August, 1897.*

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	52	T.	2	2	4	1	2	5	6	6	3	4					1	2	1	1	2	2	1	3	1	1	2			1	3	5	2	63	25	T.
		A.																																0	0	A.
Arizona	52	T.	4	5	4	1	2	6	3	2	2	2	3	2	1	2	2			1	4	1	1	3	3	4	3	3				1	4	69	26	T.
		A.																																0	0	A.
Arkansas	61	T.			1	7	11	4	6	7	7	7	1			2	9			5	2		1			1			2		5	5	3	86	19	T.
		A.																																0	0	A.
California	181	T.			1							1	1					2	2	30	16	6	4	5	7	1		1		1		1		79	15	T.
		A.																		1	1													2	2	A.
Colorado	75	T.	10	13	18	18	6	18	11	17	13	11	6	4	3	9	6	10	15	10	1	2	3					4	8	12	2	3	3	236	27	T.
		A.																																0	0	A.
Connecticut	14	T.				5	6				1	1	4	3		2	8	8	1	4				10	1	1	5							60	15	T.
		A.																																0	0	A.
Delaware	3	T.										1					2						1					1						5	4	T.
		A.																																0	0	A.
Dist. of Columbia	4	T.				1						1					1	1							1		1	1				1		8	8	T.
		A.																																0	0	A.
Florida	45	T.	6	12	14	6	7	12	10	8	15	13	8	9	9	6	7	4	7	7	9	8	11	3	11	7	10	5	3	3	2	5	2	239	31	T.
		A.																																0	0	A.
Georgia	62	T.	2	2	2		3	5				1					2	2	1				2	2	1			1			1	7	1	35	16	T.
		A.																																0	0	A.
Idaho	30	T.				7	7	4	3	4	4		1	1				1		1				4		2					3	1		43	14	T.
		A.				1																												1	1	A.
Illinois	92	T.	3	9	7	16	5				11	2				6	5			3	7		5	10	4	12	1			12	5	5		128	20	T.
		A.																1		1			1		1					1			1	6	6	A.
Indiana	54	T.	8	1		2					3					3	4				6			10		13	1			2	12	1		66	13	T.
		A.																																0	0	A.
Indian Territory	7	T.						1		2	1	1				1																		6	5	T.
		A.																																0	0	A.
Iowa	122	T.	2	15	19	9	1		7	3	7			1	10				4	4	1	8	4	1	8	8	5			13	2	1	5	138	23	T.
		A.																			5											1		6	2	A.
Kansas	85	T.		1	13	9	12	4	4	1	4	4			12	6	1	1	8	4			4		2		3				10		1	104	20	T.
		A.																																0	0	A.
Kentucky	52	T.	4	2	1	8	5			2		4		1			7			1				11	3	2	2			2	6	8		69	17	T.
		A.																																0	0	A.
Louisiana	50	T.		2	8	7	6	7	3	3		6	13	2	2	2	5	5	6	3	4	2		3	2	2	1		4	4	2	4	2	110	27	T.
		A.																																0	0	A.
Maine	14	T.	1		1			4			4					1	2	3	2		2	2		3			2							27	12	T.
		A.																				2								1				3	2	A.
Maryland	35	T.	1		1	11					4	16	5			2	17	6		1	2	1	12	1	13	2	8				1	9		113	19	T.
		A.																																0	0	A.
Massachusetts	24	T.	1			3	8				3	1	1	2		1	10	12		2	3		2	1		1	9	1	1	3	20		1	86	21	T.
		A.		1																		2												3	2	A.
Michigan	112	T.	3	1	2	9			1	10	25	4	6		1	10	15		2	3		2	1		1	9	1	1		3	20		1	131	23	T.
		A.	1	1																							1						1	4	4	A.
Minnesota	69	T.	3	5	2	2	1	1	7	11	1				10	5			2	7	1		3		6			3	1	11	5	12	22	121	22	T.
		A.	1		1						1								1		2	1						1			1			9	8	A.
Mississippi	46	T.		3	1	5	4	4	10	6	4	7	2		1	1	4	4	2	1	2	3	3	4	1	1	2		2	5	5	5	3	95	28	T.
		A.																																0	0	A.
Missouri	95	T.	1		13	26	15	11	4	2	13	3			11	2			6	1		1	20		3	3	12	1		1	4	6		159	22	T.
		A.																																0	0	A.
Montana	37	T.	1				4	2		2	1	1		2								1	1	3		1	1					4	3	27	14	T.
		A.	1	1																		1						1				1	1	6	6	A.
Nebraska	143	T.	6	7	10	1	7	1	9	14	8			1	12	1	1	4	8		1	5				6			2	5	6	2		117	22	T.
		A.																																0	0	A.
Nevada	48	T.		2	4	2	3	6	1	2	1					2	6	6	5	3	7	4	3	2	1		2	3	3	1				69	22	T.
		A.																																0	0	A.
New Hampshire	14	T.				2					6	3					6	6	1		5			2			3							34	9	T.
		A.																																0	0	A.
New Jersey	55	T.		1	1	14	9			1	6	17	11			7	27	20	6	2			5	13	8		3	7				2	3	163	20	T.
		A.																																0	0	A.
New Mexico	39	T.	2	2	1	2	4	4	4	3	4	3	3	5	3	3	3	4	5	4	4	3	5	3	3	3			2	1	3	1	1	88	29	T.
		A.																																0	0	A.
New York	103	T.			2	8	3	3		1	5	18	6	10			18	17	1	3	13			7		1	5		1		2			124	19	T.
		A.													1					1												1		3	3	A.
North Carolina	59	T.	5	8	3	6	13	5	1			6	3			7	13	7	1	2	1	3	2	5	10	2	10	1	2			13	1	130	25	T.
		A.																																0	0	A.
North Dakota	46	T.	2	1				2	1	1		1		7	9	1		2			1		2	2		1	5			3				41	16	T.
		A.	2							1										1	1			1	2	2	3				3	2	1	19	11	A.
Ohio	135	T.	22	14	14	23	1			12	14	16	6			6	32	15			11	1		8	6	30	9		2		27	5		274	21	T.
		A.		1							1	1						1	1		1	1			1	2								10	9	A.
Oklahoma	23	T.			2	1	3	2		1	4	2				1				1														17	9	T.
		A.																																0	0	A.
Oregon	62	T.			1	5	1		6	3	1									1			1		1	2					16	11		49	12	T.
		A.																																0	0	A.
Pennsylvania	105	T.			5	26	9		1	1	6	31	2	2		3	23	7		1	16		4	7	8	7	1	2					2	164	21	T.
		A.																																0	0	A.
Rhode Island	5	T.					3										3	4						2										12	4	T.
		A.																																0	0	A.
South Carolina	43	T.	2	3			5	10				3	3	1	2	10	6	2	1	2	1	6	1	2	1	2	2		1	5	6	6		83	24	T.
		A.																																0	0	A.
South Dakota	44	T.	3	2			1	2	1	5	2	2	1	1	3				2			1					1		1	2	2	1	2	35	19	T.
		A.																			1													1	1	A.
Tennessee	65	T.	7	4	4	7	9	7	1	5	3	4		2		1	7	4			4	3	2	7	3	1	3		1	3	4	13	3	112	26	T.
		A.																																0	0	A.
Texas	85	T.	1	2	2	2	2	2	2		1	4	3	2	1	1		3	1	2	1				1		1				3	3	3	43	22	T.
		A.																																0	0	A.
Utah	41	T.		4	3	5	2	5	1	4	1			10			2		1	1					1		5	3	2	1				51	17	T.
		A.																																0	0	A.
Vermont	13	T.				2	1	1			5	5	2				8	7		1	8			1		1	3							45	13	T.
		A.																															1	1	1	A.
Virginia	49	T.	4	2	2	12	2	1			1	15	1			3	7	7					5	4	14	2	8					6	5	101	19	T.
		A.																																0	0	A.
Washington	50	T.				5	10	3	4	3	1												1			1					1	7	6	42	11	T.
		A.																																0	0	A.
West Virginia	35	T.	1		5	5	1					6	1				4	3	1	1	1	1		3	4	1	2					1		41	17	T.
		A.																																0	0	A.
Wisconsin	61	T.	10	3	1	5				5	16					3	1			6			1		6	4				10	5	1	10	87	16	T.
		A.	1				1														2					1					3			8	5	A.
Wyoming	14	T.		4	1	2		2	1	1	3			1	2	1	2	2	2			1	1	1	1	1	1		1			3	1	35	22	T.
		A.																																0	0	A.
Sums	2,810	T.	117	132	173	288	194	144	108	148	214	227	93	69	92	111	277	181	94	119	136	67	112	146	136	136	133	38	39	104	183	159	90	4,260	....	T.
		A.	6	4	1	1	1	0	0	1	2	1	0	0	1	0	0	3	1	4	13	7	1	1	4	5	4	2	0	2	7	5	5	82	....	A.

TABLE X.—*Hourly sunshine as deduced from sunshine recorders, August, 1897.*

Stations.	Instrument.	Percentages for each hour of local mean time ending with the respective hour. A. M. 5	6	7	8	9	10	11	Noon	P. M. 1	2	3	4	5	6	7	8	Hours of sunshine. Total. Actual.	Possible.	Percent of possible.	Personal estimate.
																		Hours.	Hours.		
Albany, N. Y	T.	44	54	52	64	80	89	95	94	93	92	90	86	79	65	57	69	336.3	431.3	78	55
Atlanta, Ga	T.	......	39	42	43	48	59	57	52	54	55	64	55	51	44	38	0	210.8	415.8	51	47
Atlantic City, N. J	P.	......	65	66	73	72	86	82	81	76	82	81	79	75	71	56	64	317.7	423.2	75	63
Baltimore, Md	T.	......	40	40	49	60	66	75	69	70	62	57	40	21	14	12	0	205.9	423.2	49	54
Binghamton, N. Y	T.	8	44	55	58	64	72	80	81	83	80	75	70	55	51	43	31	279.4	429.4	65	50
Bismarck, N. Dak	P.	44	51	56	67	71	76	81	78	80	82	76	74	70	66	59	54	309.0	440.0	70	68
Boston, Mass	T.	67	50	54	65	65	69	73	72	77	75	68	60	55	52	45	27	270.2	429.4	63	52
Buffalo, N. Y	T.	67	40	52	75	87	92	91	92	91	86	88	87	84	69	44	31	333.0	431.3	77	49
Charleston, S. C	T.	......	22	24	42	61	62	65	69	59	58	60	53	48	32	29	......	208.0	414.0	50	44
Chattanooga, Tenn	T.	......	44	45	44	53	64	68	61	66	59	63	61	52	43	40	91	228.6	417.1	55	50
Cheyenne, Wyo	P.	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	427.4	......	55
Chicago, Ill	T.	17	30	24	43	62	69	75	80	73	71	64	63	49	23	33	35	234.0	429.4	54	55
Cincinnati, Ohio	T.	......	44	33	47	71	88	92	91	87	84	86	87	83	64	42	2	304.3	423.2	72	67
Cleveland, Ohio	T.	8	14	25	62	70	79	80	81	81	70	68	67	55	44	31	38	255.5	429.4	60	53
Columbus, Ohio	T.	40	60	62	69	83	83	88	92	87	85	78	72	65	61	41	36	313.1	425.2	74	53
Denver, Colo	P.	100	74	79	81	84	88	89	88	78	72	70	65	54	51	58	36	313.5	425.2	74	55
Des Moines, Iowa	T.	33	55	61	61	71	82	83	84	89	90	79	76	63	70	68	42	316.5	429.4	74	72
Detroit, Mich	T.	33	43	51	64	81	84	85	84	75	71	81	75	66	52	44	46	294.6	429.4	69	56
Dodge City, Kans	P.	......	54	66	82	88	83	89	85	88	90	83	85	85	74	45	43	334.0	422.1	79	69
Dubuque, Iowa	T.	17	44	46	59	65	72	77	78	77	75	77	66	58	52	47	35	274.9	429.4	64	62
Eastport, Me	P.	21	29	33	40	46	55	55	61	57	61	62	64	62	51	38	24	221.0	435.6	51	38
Erie, Pa	T.	83	55	55	60	81	85	88	88	89	91	84	80	70	60	37	35	314.8	429.4	73	52
Eureka, Cal	P.	50	7	11	10	12	22	26	37	45	44	46	39	35	32	25	35	120.4	427.4	28	40
Fresno, Cal	T.	......	76	81	84	94	100	100	100	100	100	100	100	97	92	87	96	395.2	420.1	94	88
Galveston, Tex	P.	......	4	39	62	65	72	73	70	64	64	64	61	48	43	25	......	230.8	408.0	57	50
Harrisburg, Pa	T.	100	63	66	72	85	85	94	95	98	90	86	71	67	53	43	21	325.3	425.2	77	55
Helena, Mont	P.	88	83	86	87	89	96	97	92	92	82	81	83	79	74	70	67	374.1	440.0	85	78
Idaho Falls, Idaho	T.	0	32	36	51	68	86	89	91	88	92	83	75	61	45	45	34	290.2	431.3	67	65
Indianapolis, Ind	T.	0	44	47	61	65	76	80	75	86	81	74	76	70	61	50	43	289.2	425.2	68	52
Kansas City, Mo	P.	......	55	58	71	72	77	77	79	78	81	81	69	71	69	63	36	304.0	423.2	72	68
Key West, Fla	T.	......	54	55	73	81	88	96	97	94	81	76	83	70	51	44	....	308.6	403.3	77	47
Little Rock, Ark	T.	......	68	80	93	94	94	94	98	98	95	85	85	78	68	52	100	355.7	417.1	85	65
Los Angeles, Cal	P.	......	42	49	50	62	76	89	95	96	98	98	98	99	97	97	100	343.8	415.8	83	72
Louisville, Ky	T.	......	64	61	64	80	91	94	94	92	87	81	72	62	45	33	29	300.1	422.1	73	55
Minneapolis, Minn	T.	42	38	44	53	73	80	76	81	83	78	78	75	65	49	47	48	286.5	435.6	66	......
Nashville, Tenn	T.	......	67	72	71	74	82	85	92	91	91	87	90	72	70	54	50	330.7	418.7	79	66
New Orleans, La	T.	......	43	39	37	38	41	51	56	57	53	45	42	36	26	27	......	174.0	409.7	42	43
New York, N. Y	T.	50	29	41	61	72	85	88	80	82	82	80	82	78	62	40	60	296.5	427.4	69	53
Northfield, Vt	P.	27	25	40	66	69	70	71	70	73	70	60	66	57	44	23	18	248.9	433.6	57	45
Omaha, Nebr	P.	50	46	57	70	79	82	83	83	76	75	77	73	75	69	66	45	309.4	427.4	72	57
Parkersburg, W. Va	T.	......	58	61	57	60	67	65	70	71	71	66	57	44	44	44	36	253.4	423.2	60	45
Philadelphia, Pa	T.	100	54	64	71	71	73	81	75	76	76	75	64	54	45	46	36	281.9	425.2	66	50
Phœnix, Ariz	P.	......	52	62	69	79	84	88	91	90	93	92	89	80	65	45	......	324.3	414.0	78	71
Pittsburg, Pa	T.	0	10	10	16	50	63	76	75	76	64	60	53	34	13	10	5	188.4	427.4	44	49
Portland, Me	T.	7	15	38	60	71	75	78	85	87	86	77	74	69	54	20	0	274.9	433.6	63	52
Portland, Oreg	T.	65	72	70	74	79	80	85	86	88	93	88	85	83	80	82	81	357.5	437.6	82	71
Portland, Oreg	P.	65	73	73	76	79	79	83	79	82	85	85	84	83	81	82	81	350.8	437.6	80	71
Raleigh, N. C	T.	......	42	50	62	69	78	76	86	85	90	85	76	71	64	57	92	300.1	418.7	72	48
Rochester, N. Y	T.	67	49	49	50	61	65	72	72	70	74	73	63	50	39	46	31	256.0	431.3	59	56
St. Louis, Mo	T.	......	57	64	73	75	85	86	93	94	86	91	94	87	74	62	64	341.3	423.2	81	64
St. Paul, Minn	P.	21	40	53	64	65	63	61	60	60	61	65	61	64	61	50	41	256.5	435.6	59	45
Salt Lake City, Utah	P.	64	70	75	71	78	89	90	94	82	77	78	82	76	69	43	15	328.3	427.4	77	48
San Diego, Cal	P.	......	21	23	25	50	72	84	95	96	99	99	97	94	90	79	......	307.9	414.0	74	82
San Francisco, Cal	T.	......	2	12	24	31	52	81	94	99	98	99	95	77	44	17	29	255.1	422.1	60	54
Santa Fe, N. Mex	P.	......	48	77	93	96	91	90	87	74	65	59	61	56	43	24	50	292.8	418.7	70	56
Savannah, Ga	P.	......	54	55	64	62	72	61	55	59	63	53	46	41	32	27	......	221.2	412.6	54	44
Seattle, Wash	T.	60	46	53	62	83	91	96	97	96	93	93	89	86	76	70	61	356.1	442.5	80	72
Spokane, Wash	T.	56	73	87	96	98	97	97	97	97	97	96	91	92	77	65	49	394.4	442.5	89	65
Tampa, Fla	T.	......	71	70	65	76	78	77	75	73	66	65	55	33	35	35	......	256.0	406.9	63	58
Vicksburg, Miss	T.	......	17	20	51	74	78	83	83	91	86	82	66	57	42	25	......	260.6	412.6	63	54
Washington, D. C	P.	.....	73	78	84	83	87	90	83	78	84	77	74	73	67	57	64	330.8	423.2	78	61
Wilmington, N. C	T.	......	22	31	62	85	80	86	89	80	81	76	68	66	47	28	......	275.0	415.8	66	62

TABLE XI.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded* 0.25 *in any 5 minutes, or* 0.75 *in* 1 *hour during August,* 1897, *at all stations furnished with self-registering gauges.*

Station.	Date.	Total duration. From—	Total duration. To—	Total am't of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.	22	1.05 p.m.	3.50 p.m.	0.43	1.16 p.m.	1.30 p.m.	0.01	0.26	0.35	0.40	0.42										
Atlanta, Ga	2	7.09 a.m.	8.10 a.m.	1.61	7.22 a.m.	8.00 a.m.	0.06	0.26	0.53	0.79	0.89	1.00	1.24	1.47	1.55						
Atlantic City, N. J.	10-11	11.20 p.m.	D. N.	1.19	12.41 a.m.	12.54 a.m.	0.25	0.15	0.18	0.25	0.57	0.90	0.98								
Baltimore, Md.	9-10	11.30 p.m.	5.10 a.m.	1.60	1.30 a.m.	2.20 a.m.	0.40	0.03	0.07	0.12	0.19	0.25	0.42	0.52	0.62	0.77	0.82				
Do	23	11.03 a.m.	11.58 a.m.	0.74	11.33 a.m.	11.55 a.m.	0.02	0.14	0.24	0.48	0.71										
Binghamton, N. Y.	4-5			0.74														0.37			
Bismarck, N. Dak.	7			0.50							0.40										
Boston, Mass.	4	4.38 p.m.	5.14 p.m.	0.58	4.50 p.m.	5.10 p.m.	0.04	0.06	0.23	0.46	0.53										
Do	24	8.45 a.m.	1.40 p.m.	1.45	12.40 p.m.	1.28 p.m.	0.58	0.03	0.07	0.24	0.42	0.53	0.57	0.61	0.71	0.82	0.85				
Buffalo, N. Y.	10			0.33														0.23			
Cairo, Ill.	22			0.16								0.15									
Charleston, S. C.*	2			1.85														1.97			
Chicago, Ill.	9	4.20 p.m.	4.55 p.m.	0.38	4.20 p.m.	4.40 p.m.	0.00	0.07	0.17	0.30	0.37										
Cincinnati, Ohio	22			0.53														0.34			
Cleveland, Ohio	29	7.50 p.m.	8.40 p.m.	0.52	7.54 p.m.	8.16 p.m.	0.01	0.07	0.17	0.33	0.43										
Columbus, Ohio	29			0.36						0.29											
Denver, Colo	4			0.76														0.38			
Des Moines, Iowa	3	7.25 p.m.	8.30 p.m.	0.66	7.55 p.m.	8.10 p.m.	0.01	0.10	0.37	0.65											
Detroit, Mich	4	12.25 p.m.	1.25 p.m.	0.68	12.38 p.m.	1.02 p.m.	0.05	0.14	0.22	0.29	0.50	0.57									
Dodge City, Kans.	17	2.05 a.m.	4.30 a.m.	1.30	2.28 a.m.	3.01 a.m.	0.10	0.15	0.35	0.45	0.50	0.55	0.67	0.72	0.75	0.78	0.80	0.85	0.95	1.07	1.20
Duluth, Minn	8	2.46 p.m.	3.35 p.m.	1.04	3.00 p.m.	3.18 p.m.	0.01	0.34	0.79	0.95	0.99										
Eastport, Me	3	11.35 p.m.	11.55 p.m.	0.45	11.43 p.m.	11.53 p.m.	0.05	0.05	0.20	0.40											
Do	11	8.30 a.m.	11.45 p.m.	1.55	4.42 p.m.	5.10 p.m.	0.66	0.15	0.25	0.36	0.52	0.66	0.75								
Erie, Pa	15-16	6.51 p.m.	D. N.	1.25	7.53 p.m.	8.13 p.m.	0.32	0.11	0.22	0.52	0.57										
Galveston, Tex	17			1.75														0.67			
Harrisburg, Pa	23	12.02 p.m.	12.17 p.m.	0.44	12.05 p.m.	12.17 p.m.	T.	0.26	0.42	0.44											
Hatteras, N. C.	5	8.40 p.m.	11.20 p.m.	1.50	8.50 p.m.	9.20 p.m.	0.05	0.15	0.42	0.71	0.97	1.15	1.26								
Indianapolis, Ind.	22			0.22														0.17			
Jacksonville, Fla.	13	3.40 p.m.	5.48 p.m.	1.65	3.59 p.m.	4.19 p.m.	0.05	0.45	0.85	1.15	1.60										
Jupiter, Fla	25	11.30 a.m.	1.00 p.m.	2.24	11.50 a.m.	12.35 p.m.	0.05	0.30	0.70	1.07	1.62	1.75	1.85	1.95	2.05	2.15					
Kansas City, Mo	13-14			0.76														0.47			
Key West, Fla.	6	1.30 p.m.	3.31 p.m.	1.04	3.18 p.m.	3.30 p.m.	0.40	0.30	0.55	0.62											
Do	26	5.58 p.m.	7.20 p.m.	1.42	6.04 p.m.	6.41 p.m.	0.05	0.15	0.40	0.70	1.00	1.11	1.20	1.28	1.32						
Lincoln, Nebr.	17	2.23 p.m.	2.56 p.m.	1.17	2.29 p.m.	2.50 p.m.	0.01	0.25	0.65	1.00	1.05										
Little Rock, Ark	6	6.56 p.m.	8.00 p.m.	1.21	7.09 p.m.	7.38 p.m.	0.03	0.13	0.33	0.53	0.75	0.98	1.09								
Louisville, Ky	22	11.45 a.m.	1.35 p.m.	0.64	11.55 a.m.	12.30 p.m.	T.	0.05	0.32	0.42	0.52	0.55									
Memphis, Tenn.	30	4.45 p.m.	5.15 p.m.	1.06	4.45 p.m.	5.12 p.m.	0.00	0.16	0.39	0.65	0.83	1.02	1.04								
Milwaukee, Wis.	1	1.30 a.m.	7.00 a.m.	2.11	1.53 a.m.	2.26 a.m.	0.10	0.10	0.19	0.30	0.46	0.61	0.80	0.91							
Montgomery, Ala.	6	7.05 p.m.	8.45 p.m.	0.62	7.16 p.m.	7.37 p.m.	0.01	0.15	0.35	0.47	0.56										
Nantucket, Mass.	24	6.23 a.m.	1.13 p.m.	1.06	10.30 a.m.	10.49 a.m.	0.20	0.10	0.33	0.50	0.66	0.71	0.75								
Nashville, Tenn.*	7			1.15														1.10			
New Orleans, La.	15	12.35 p.m.	1.35 p.m.	0.52	12.39 p.m.	12.49 p.m.	T.	0.27	0.44	0.50											
New York, N. Y.	22	6.24 p.m.	7.14 p.m.	0.63	6.26 p.m.	6.35 p.m.	T.	0.15	0.45	0.53	0.61	0.62									
Do	24	1.40 a.m.	6.55 a.m.	1.15	5.47 a.m.	6.26 a.m.	0.26	0.05	0.08	0.09	0.22	0.36	0.41	0.53	0.70	0.72					
Norfolk, Va.	23	10.20 p.m.	11.50 p.m.	0.59	11.03 p.m.	11.31 p.m.	0.02	0.18	0.27	0.35	0.41	0.49	0.55								
Do	30	5.15 p.m.	7.25 p.m.	0.57	5.30 p.m.	5.55 p.m.	0.01	0.14	0.31	0.37	0.42	0.47									
Northfield, Vt	9	1.28 p.m.	2.50 p.m.	1.00	1.42 p.m.	2.03 p.m.	0.05	0.45	0.73	0.80	0.87										
Oklahoma, Okla.	14			0.60														0.30			
Omaha, Nebr.	13			0.58														0.44			
Parkersburg, W. Va.	2			0.61										0.49							
Philadelphia, Pa.	10	8.40 p.m.	D. N.	1.61	10.48 p.m.	11.20 p.m.	0.53	0.20	0.30	0.51	0.66	0.72	0.81	0.87							
Pittsburg, Pa	11			0.40						0.40											
Portland, Me.	24			0.61														0.29			
Portland, Oreg.	31			0.15														0.07			
Raleigh, N. C	21			0.35														0.28			
Rochester, N. Y.	15			0.24						0.20											
St. Louis, Mo.	30			0.26														0.11			
St. Paul, Minn	30-31			0.76														0.39			
Salt Lake City, Utah	6			0.22														0.15			
San Diego, Cal	12			T.																	
San Francisco, Cal.	3			T.																	
Savannah, Ga	14	4.05 p.m.	5.55 p.m.	1.99	4.08 p.m.	4.45 p.m.	T.	0.03	0.32	0.63	1.01	1.30	1.47	1.61	1.71	1.75	1.78	1.83	1.86		
Do	15	5.05 p.m.	6.45 p.m.	0.90	5.09 p.m.	5.25 p.m.	T.	0.36	0.56	0.62											
Seattle, Wash.	31			0.24														0.15			
Tampa, Fla.	10	9.40 a.m.	5.20 p.m.	1.02	10.27 a.m.	10.36 a.m.	0.20	0.05	0.35	0.52											
Do	21	7.42 p.m.	8.45 p.m.	1.05	8.17 p.m.	8.30 p.m.	0.20	0.32	0.65	0.82											
Vicksburg, Miss.	28			0.83														0.83			
Washington, D. C	10	7.30 p.m.	9.10 p.m.	1.92	8.13 p.m.	8.38 p.m.	T.	0.18	0.56	1.08	1.62	1.86	1.87	1.88	1.90	1.92					
Wilmington, N. C	1	7.00 p.m.	8.30 p.m.	0.72	7.30 p.m.	8.00 p.m.	0.14	0.19	0.33	0.41	0.46	0.53	0.58								
Yankton, S. Dak	17			0.43														0.32			

* Record incomplete.

TABLE XII.—*Excessive precipitation, by stations, for August*, 1897.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Ins.*	*h. m.*	
Alco	12.19	5.74	18			
Bermuda	13.45	5.33	17-18			
Brewton		4.25	18			
Citronelle	13.83					
Healing Springs	10.29	3.85	8			
Livingston		2.78	8-9			
Lock No. 4				1.05	0 50	6
Mobile	11.56	3.50	18-19			
Newburg		3.09	20			
Newton		3.05	18			
Riverton				2.00	1 15	6
Rockmills		2.56	19			
Do		2.78	30			
Tallassee		2.92	16			
Valleyhead		2.60	10			
Arizona.						
Arizona Canal Company's Dam				1.56	1 00	12
Arkansas.						
Conway		2.50	8			
Dallas		2.80	9	2.80	2 00	9
Elon				1.43	0 30	8
Do				1.28	1 10	10
Forrest		2.80	15			
Fort Smith		4.25	8			
Hardy				1.15	0 45	5
Little Rock				1.20	0 51	6
Picayune				1.81	1 30	4
Warren				2.00	2 00	15
Colorado.						
Castle Rock		4.00	3	3.00	1 00	3
Hugo (near)		2.80	4			
Lamar				1.20	0 40	10
Pueblo				1.50	1 00	4
Seibert		2.50	6	2.45	0 30	14
Connecticut.						
New Haven				1.00	1 00	22
Voluntown				1.60	1 30	18
Windsor		3.92	4-5	3.00	0 50	4
Delaware						
Millsboro		3.11	10			
District of Columbia.						
Washington				1.95	0 47	10
Florida.						
Amelia		2.50	7			
Bartow				1.97	0 50	23
Brooksville				1.07	0 10	15
Clermont				2.11	1 00	3
Do				1.50	1 00	7
DeFuniak Springs	12.41	2.90	18			
Do		2.95	22			
Emerson		3.65	12			
Haywood				1.28	1 00	16
Do				1.16	0 30	18
Jacksonville				1.63	1 00	13
Jupiter		3.14	24-25	2.19	1 00	25
Key West				1.41	1 00	26
Macclenny	12.11	5.17	7	5.17	4 30	7
Do		2.53	20			
Milton	10.99	3.40	18			
Ocala		2.78	20			
Oxford		4.00	9	4.00	2 00	9
Do				1.10	1 00	17
Tampa				1.06	0 45	21
Tarpon Springs				1.87	1 00	5
Georgia.						
Atlanta				1.61	1 00	2
Augusta	10.39	2.54	6	2.54	1 49	6
Do				2.34	1 27	10
Blakely		3.25	18			
Jesup		3.25	21			
Milledgeville		2.65	10			
Point Peter		2.51	16			
Poulan		2.96	6	1.82	1 30	5
Do				2.96	1 30	6
Savannah				1.86	1 00	14
Indiana.						
Bluffton		3.04	1			
Columbia City		3.07	1			
South Bend		2.88	1			
Syracuse		2.93	1			
Indian Territory.						
Healdton		2.80	14			
Tahlequah		3.90	8			
Tulsa		2.50	8			
Wagoner		2.55	8			
Iowa.						
Alta				1.35	0 55	7
Britt				2.21	1 30	7
Cresco		3.06	4			
Hampton				1.33	1 05	2
Iowa Falls				1.43	1 15	2
New Hampton				1.30	1 00	24
Webster City				2.20	1 30	2
Kansas.						
Abilene				2.42	1 25	4
Assaria				1.62	1 30	13
Eureka				1.63	1 00	5
Goodland		2.51	16			
Grainfield				2.00	2 00	8
Oberlin				1.35	0 45	10

TABLE XII.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Kansas—Continued.	*Inches.*	*Inches.*		*Ins.*	*h. m.*	
Ulysses				1.55	1 00	17
Wamego				1.37	1 00	9
Winona		3.00	17	3.00	2 20	17
Yates Center				1.30	0 45	3
Kentucky.						
Marrowbone		2.70	5			
Mount Sterling				1.55	0 30	10
Louisiana.						
Alexandria		2.74	18			
Amite	10.62	4.10	19			
Baton Rouge	10.70	2.50	19			
Emilie		2.52	11			
Hammond	13.46	4.45	18			
Jeanerette		2.66	16			
Lafayette		3.80	19			
Lake Providence				1.10	0 50	7
Melville	10.70	4.00	18			
Montgomery		5.85	17			
New Iberia		2.60	16			
Opelousas	10.56					
Rayne		4.20	20			
Venice	10.67	4.25	18			
Wallace		3.06	11			
White Sulphur Springs		6.02	16-17			
Maine.						
Bar Harbor		2.50	19			
Maryland.						
Deerpark		3.20	4			
Fallston		3.23	10			
Greenspring Furnace				1.16	0 50	21
Mardela Springs				1.20	1 00	21
Massachusetts.						
Fallriver				1.30	1 00	18
Groton				1.47	0 35	22
Lawrence				1.18	1 00	22
New Bedford		4.60	16			
Michigan.						
Adrian				1.10	1 00	9
West Harrisville				1.00	0 50	9
Minnesota.						
Duluth				1.36	0 48	8
Le Sueur		3.75	31			
Reeds		2.64	1			
Willmar		2.65	31			
Mississippi.						
Austin		2.51	9	2.51	1 15	9
Briers		3.30	18			
Canton		3.27	17			
Columbus		2.56	7			
Leakesville	15.57	5.12	17			
Magnolia	15.60	4.20	11			
Do		7.50	17-19			
Meridian	10.36	3.97	9			
Natchez		2.50	19			
Waynesboro		2.55	9			
Woodville		4.48	18	2.50	1 30	18
Missouri.						
Emma		3.00	6			
Fairport				1.17	0 50	3
Do				1.23	0 20	4
Houstonia		6.88	5-6			
Lexington		2.68	6			
Liberty		3.00	6			
Mansfield		3.75	4-5			
Oregon		2.70	6			
Seymour		2.60	6			
Nebraska.						
Aurora				1.29	0 40	3
Beatrice		3.30	5			
Benkelman		2.64	10	2.64	2 05	10
Culbertson				1.25	0 30	8
David City				1.00	1 10	3
Eden		3.02	6			
Edgar		3.25	5			
Fairbury		2.56	5			
Hickman				1.10	1 00	13
Lincoln				1.15	0 33	17
Loup		4.05	2-3			
North Platte				1.00	0 55	8
Ravenna		4.12	8			
Strang		3.27	5			
Wilsonville		2.95	4	1.12	1 00	7
New Jersey.						
Atlantic City				1.11	1 00	11
Bayonne		2.80	23-24			
Charlotteburg		3.10	15-16			
Do		3.35	23-24			
Chester				1.60	1 00	16
Do				1.55	1 30	22
Clayton		2.65	23			
Elizabeth		4.08	23-24			
Franklin Furnace		2.85	5			
Gillette		2.80	22			
Hanover		2.50	24			
Newark		6.11	23-24			
Ocean City				1.40	0 55	9
Paterson		2.50	23	2.31	1 00	10
Perth Amboy		2.75	23-24			
Plainfield		2.69	23-24			
Roseland		2.78	24			

Table XII.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
New York.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Number Four		2.84	10-11			
South Kortright		2.75	10-11			
North Carolina.						
Hatteras				1.40	1 00	5
Mana		2.50	6			
Selma		3.25	23			
Southern Pines		2.95	7			
Southport		3.24	7			
Willeyton				1.22	1 00	8
Ohio.						
Big Prairie				1.70	1 30	29
Colebrook		2.55	23	2.55	1 30	23
Hillsboro				1.94	1 00	2
Do				1.25	1 00	25
Perry		3.20	15			
Oklahoma.						
Jefferson		3.20	29			
Mangum		2.50	10			
Woodward		2.58	9			
Pennsylvania.						
Chambersburg		2.80	23			
Philadelphia				1.12	1 00	10
Scranton				1.10	1 00	15
Williamsport		4.26	23-24			
York		2.76	10			
South Carolina.						
Anderson		3.30	5			
Charleston				1.97	1 00	2
Effingham		2.85	18-19			
Kingstree		2.50	6			
Port Royal				1.98	1 00	14
St. Georges		2.70	6-7			
Do		3.90	14-15			
St. Stephens				1.73	1 30	10
Smiths Mills		3.75	10	3.75	1 45	10
Spartanburg				1.95	0 18	14
Statesburg		3.37	19			
Trenton		2.91	19			
Trial		3.07	6-7			
Walhalla				1.50	1 00	5
Yemassee		2.60	22			
South Dakota.						
Mitchell				1.10	0 40	8

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Table XII.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Tennessee.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Byrdstown		4.14	5-6	3.13	1 10	5
Carthage		3.45	15-16			
Hickory Withe		3.93	9-10	3.70	3 00	9
Knoxville				1.02	0 55	5
Lynnville				1.60	1 30	5
McKenzie				1.25	1 00	30
Memphis				1.06	0 25	30
Molino		2.81	7	2.81	2 00	7
Nashville				1.10	1 00	7
New Market		2.64	5-6	2.49	1 30	5
Riddleton		2.55	22-23			
Texas.						
Beeville				1.00	0 45	19
Brenham				1.01	1 00	12
Coleman				1.30	0 30	10
Emory				1.98	1 00	10
Do				2.45	2 00	16
Forestburg				2.00	1 00	10
Fort Ringgold		2.56	20			
Fort Stockton		2.88	17			
Fredericksburg		3.27	18			
Grapevine		2.50	16	2.50	2 10	16
Llano				1.30	0 30	10
Sulphur Springs				2.05	1 00	6
Tivoli				2.07	2 00	17
Weatherford				1.08	0 45	18
Vermont.						
Chelsea				1.34	0 20	16
Strafford		2.50	9			
Virginia.						
Birdsnest		3.00	24			
Clifton Forge		3.00	22	3.00	2 45	22
Hampton				1.00	0 30	30
Stanardsville				1.40	1 15	23
Warsaw		2.96	11			
West Virginia.						
Point Pleasant		2.60	22-23			
Rowlesburg		3.04	3			
Wisconsin.						
Milwaukee				1.00	1 00	1

Chart I. Tracks of Centers of High Areas. August, 1897.

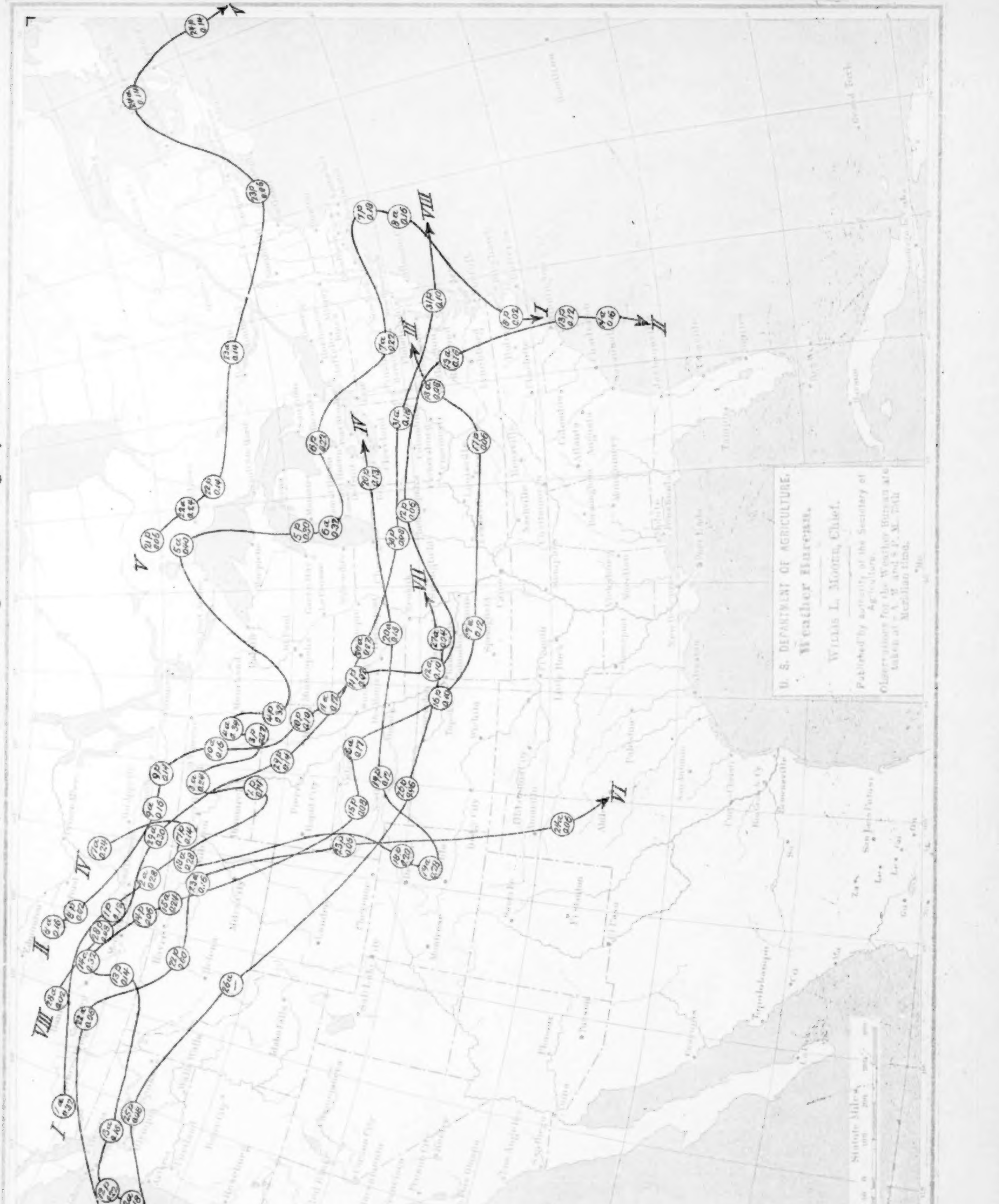


Chart II. Tracks of Centers of Low Areas. August, 1897.

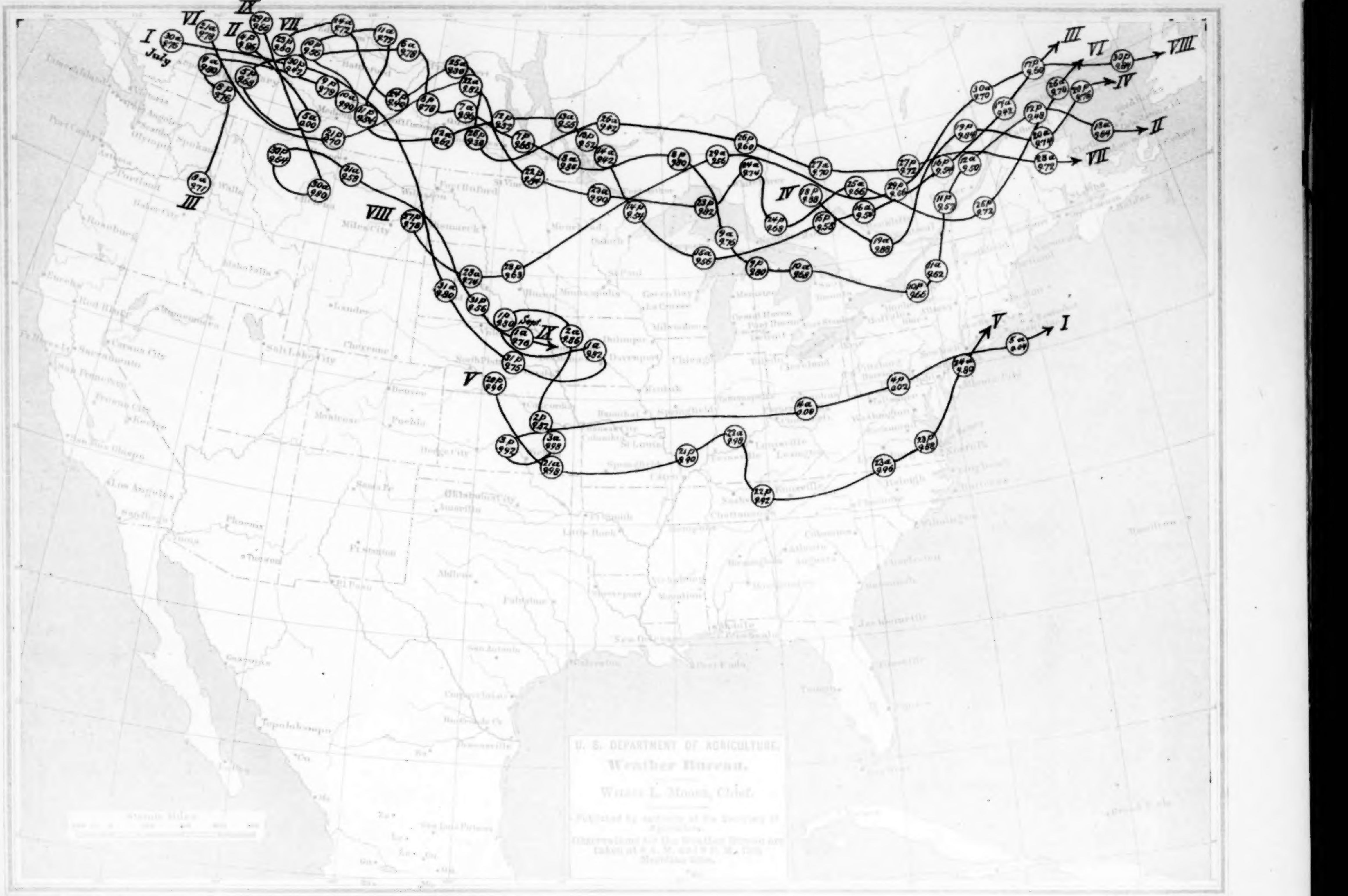


Chart III. Total Precipitation. August, 1897.

Chart III. Total Precipitation. August, 1897.

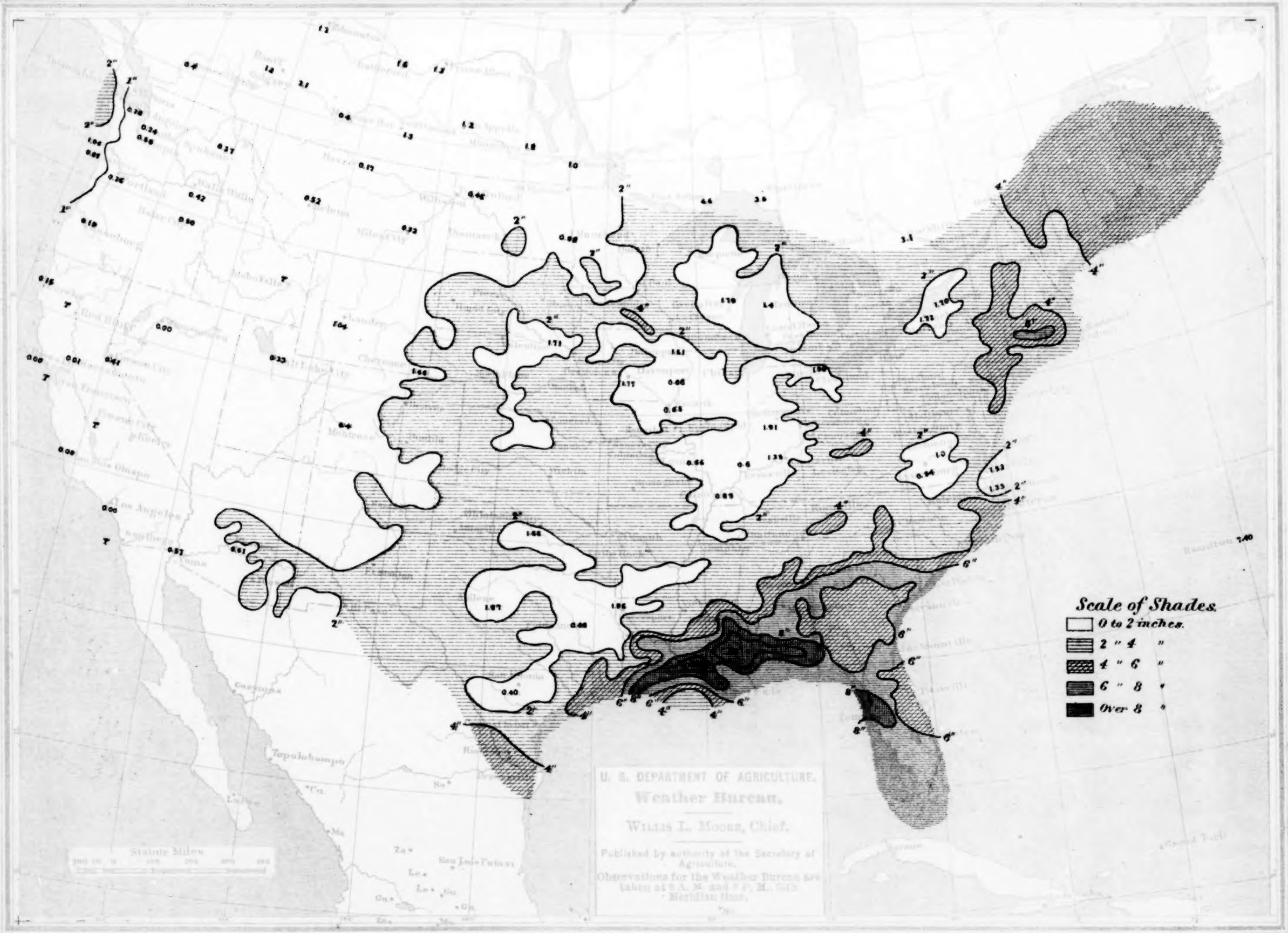


Chart IV. Isobars, Isotherms, and Resultant Winds. August, 1897.

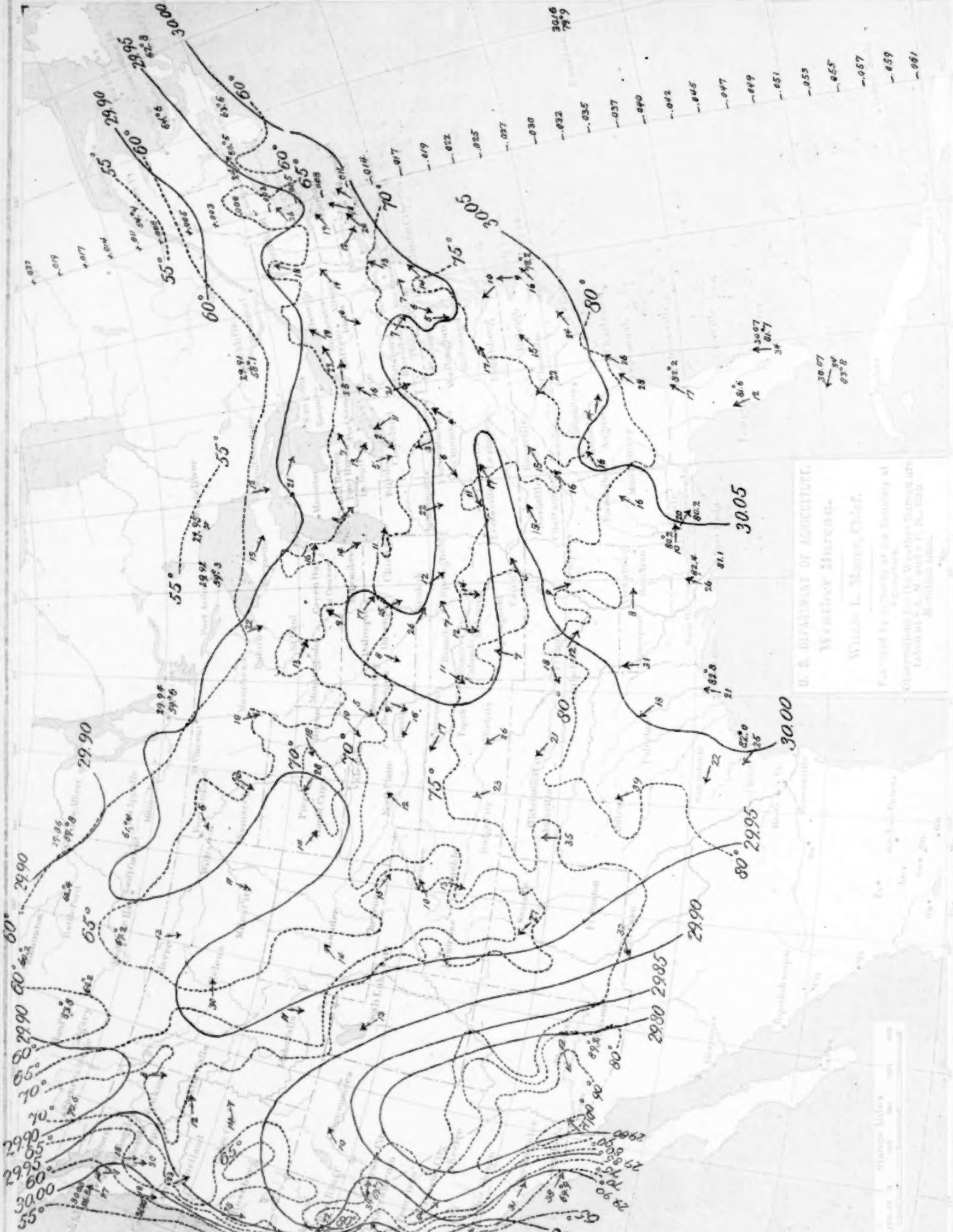


Chart V. Hydrographs for Seven Principal Rivers of the United States.

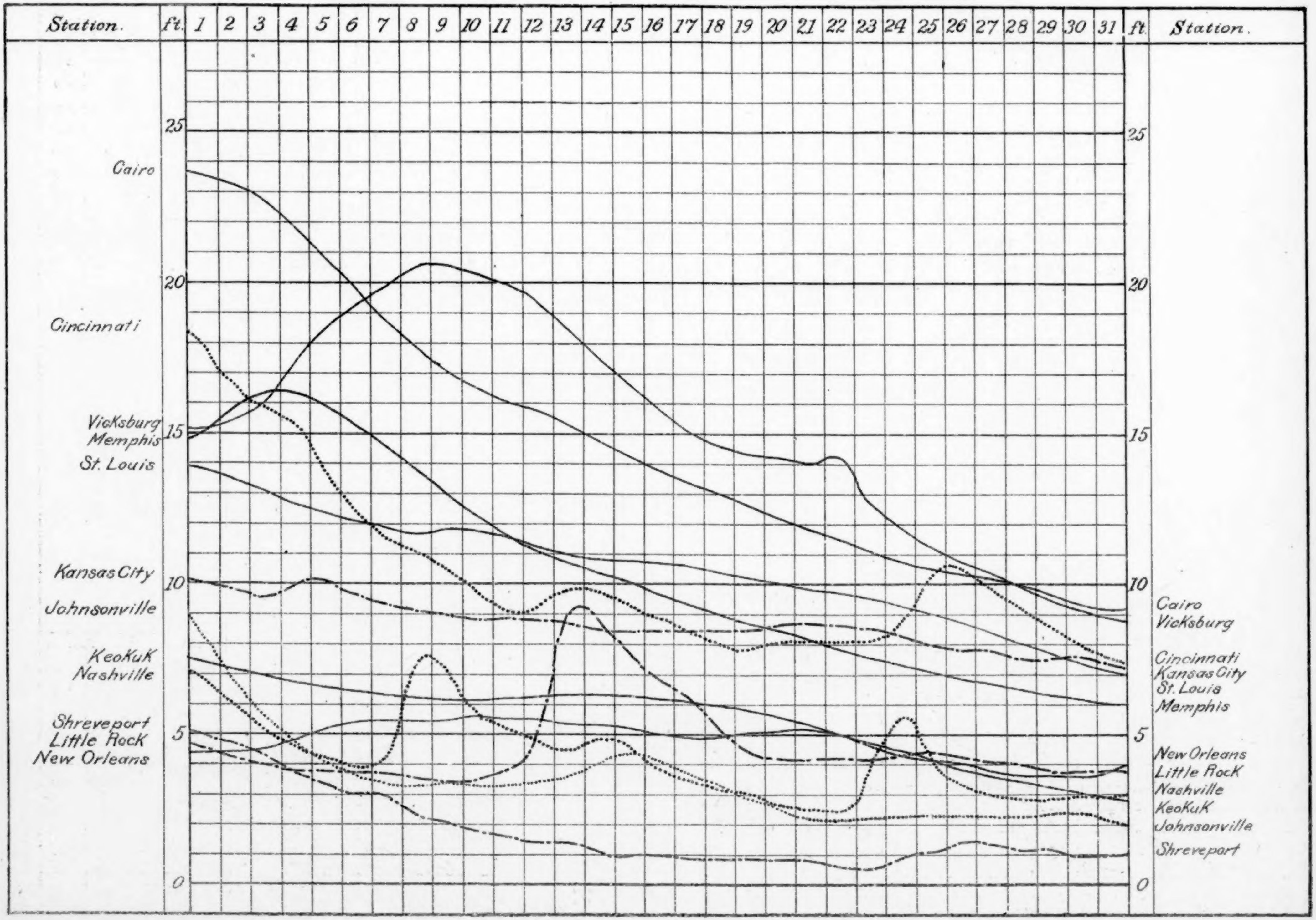


Chart VI. Diagrams to accompany "The Mechanism of the Kite," by Mr. Decker.

FIG. 1.—Relative total pressures normal to inclined square plates, as obtained by different observers.

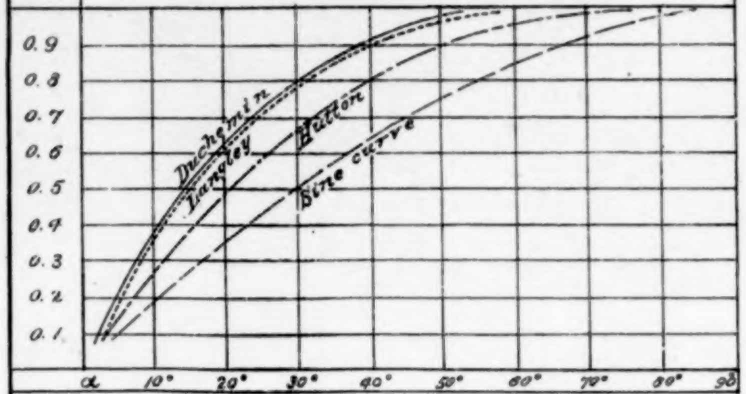
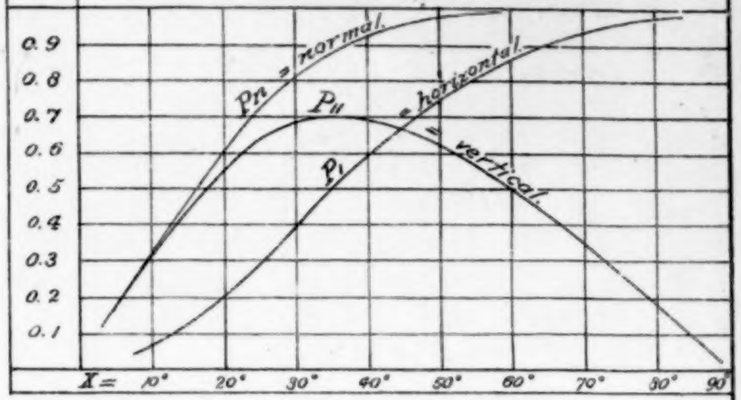


FIG. 3.—Curves representing Duchemin's factor P_n and the component pressures $P_I = P_n \sin \alpha$ and $P_{II} = P_n \cos \alpha$.



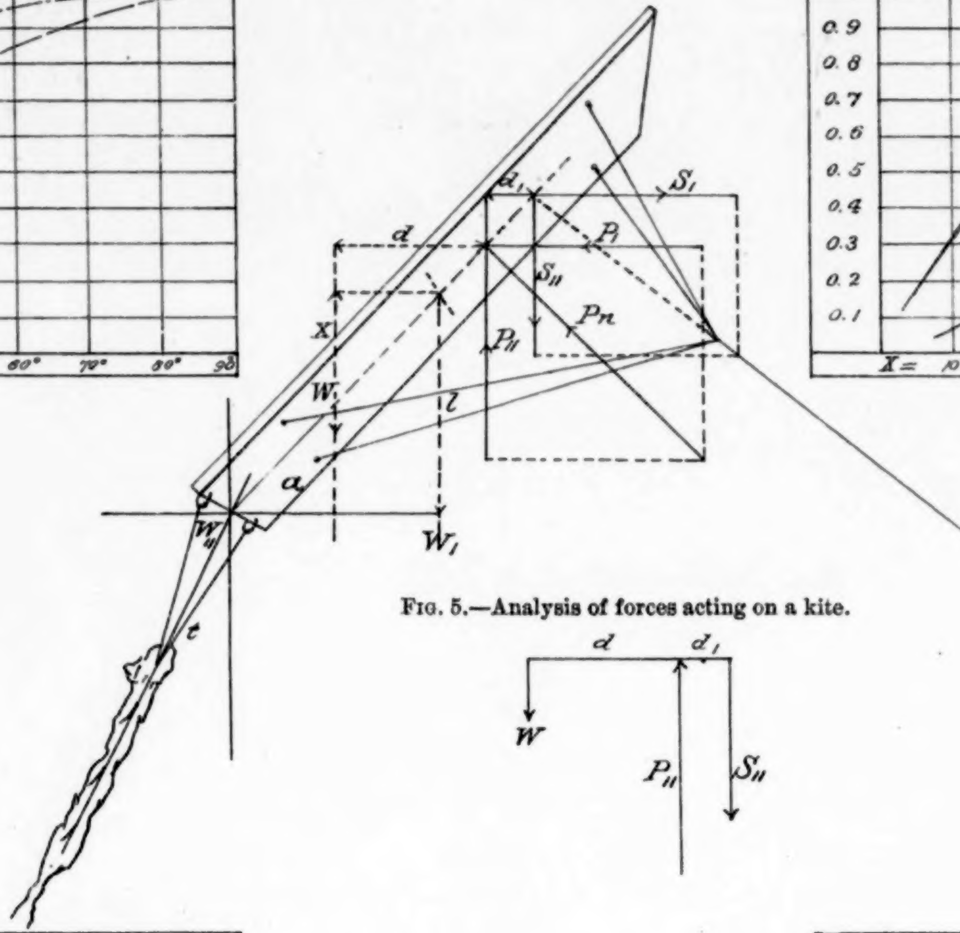


FIG. 5.—Analysis of forces acting on a kite.

FIG. 2.—Relative total pressures normal to inclined rectangular plates, all having the same areas but different proportions. From Langley.

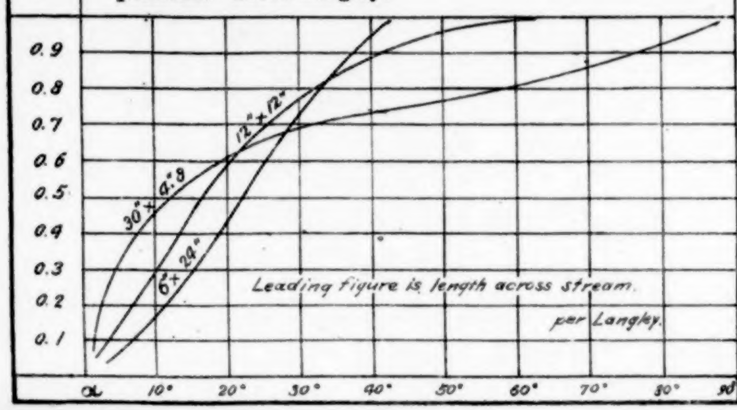


FIG. 4.—Curves showing d/l or the relative distance d of the center of pressure in front of the center of area for squares whose side is l.